100 Bodybuilding Myths Busted 🏋️🥗🥩

Preview

Tier 1: Beginners	Tier 2: Intermediates	Tier 3: Advanced/Professional	Tier 4: Bodybuilding experts and coaches
1. *Fasting/Cardio kill muscle*	26. *Supplements are a waste of money / dont make a difference*	51. *DHT-derivatives are the worst steroids for hair loss (speed up Androgenic Alopecia the most)*	76. *RAD-140's half life*
2. *Each exercise needs a preset number of reps*	27. *You need to begin incorporating advanced techniques i.e drop sets, super sets etc*	52. *Only oral anabolic steroids are bad for your liver*	77. *Golden era guys only took 100mg of Dianabol and Primobolan trust me bro*
3. *Your workout was subpar if your not sore the next day*	28. *You need a 'deload' week*	53. *Using TRT is healthier than having low Testosterone levels*	78. *Anabolic Androgenic Steroids downregulate androgen receptors*
4. *Deadlifts are 'bad' for your lower back*	29. *Occasional alcohol consumption wont stunt muscle growth*	54. *Anabolic steroids are not that nephrotoxic*	79. *Exogenous GH doesn't cause suppression of natural levels*
5. *High volume programs > low volume programs (and Vice versa)*	30. *If it's only 'slight' joint/tendon pain you can train through it*	55. *Using myostatin inhibitors with a cycle*	80. *Proviron is a fat burner*
6. *Using heavyweights is 'dangerous'*	31. *Add extra reps instead of weight for progressive overload*	56. *MK-677 builds 90% water*	81. *x ester is 'better' than x ester*
7. *If It Fits Your Macros (IIFYM) aka 'All calories are equal'*	32. *You can outtrain a bad diet*	57. *Steroids actions are limited to the androgen receptor*	82. *The anabolic/androgenic ratio (sorta)*
8. *Squats are 'bad for your knees'*	33. *It doesn't matter what time of day you train*	58. *Finasteride will stunt muscle growth*	83. *MK-677 lowers Testosterone indirectly*
9. *Stretching before resistance training prevents injuries*	34. *Forearms and calves are 100% genetic and can't be grown*	59. *SARMS are more Hepatotoxic (liver toxic) than steroids*	84. *Growth hormone will cause a bloated, watery, soft physique*
10. *Shocking the muscle rather than progressive overload*	35. *Do your cardio after you lift*	60. *If a steroid is a substrate for 5 alpha reductase it isn't 'hair-safe'*	85. *Combining diuretics is pointless*
11. *The infamous 'anabolic window'*	36. *You need to do fasted cardio*	61. *If you overtrain you're risking rhabdomyolysis*	86. *Steroids increase appetite (sorta)*
12. *There is only one correct way to do every movement*	37. *Bulking for over a year*	62. *If your biomarkers are within normal ranges on cycle, your health isn't suffering*	87. *Prolactin-induced Gynecomastia*
13. *Train to failure on every set*	38. *The appearance of your abs is 100% genetic*	63. *Peptides are side effect free*	88. *Boldenone won't cause anxiety*
14. *You don't need to do anything on rest days for recovery*	39. *Lean gaining or main gaining are more effective than bulking*	64. *You need muscle sparring steroids on a cut to maintain muscle mass*	89. *If you don't experience x effect when using x compound, then its counterfeit*
15. *Train every muscle with the same volume*	40. *Free weights are better than machines (and vice versa)*	65. *SARMS are 'hair safe'*	90. *Steroids reduce injury risk*
16. *Deadlifts will make your waist bigger*	41. *__ split is better than __ split*	66. *SARMS are not potent muscle builders*	91. *Nandrolone for joint healing*
17. *Rep list: 1-5 for strength, 6-12 for muscle, >12 for endurance*	42. *Your going to lose muscle after 2 weeks of not training*	67. *'Third party tested' means the research chemical is high quality*	92. *Boldenone is 100% kidney toxic (sorta)*
18. *Heavy weights/low reps = bulky*	43. *Gaining pounds of muscle in a week using <Insert supplement>*	68. *BPC-157 + TB-500 is the wolverine stack*	93. *HGH will improve your sleep quality*
19. *Light weights/high reps = toned*	44. *Muscle density*	69. *The infamous 'myostatin gene'*	94. *Halotestin has x effect on HPT axis*
20. *Fats/Carbs are 'bad' for you*	45. *High protein diets harm the kidneys*	70. *MK-677 helps hair loss*	95. *Trenbolone is 7.5x more anabolic than Testosterone*
21. *Soy products cause an estrogen increase*	46. *The importance of carb timing*	71. *BPC-157 has no human studies and safety data*	96. *All steroids improve insulin resistance*
22. *Vegan/vegetarian diets stunt muscle growth*	47. *Creatine is bad for your kidneys*	72. *'Bubble gut' is caused by primarily Growth Hormone ('GH gut')*	97. *Anadrol isn't estrogenic*
23. *If you eat more than 30g of protein in a meal, your body cant absorb it*	48. *Creatine will cause hair loss*	73. *MK-677 causes brain damage*	98. *Water retention from a compound is a mild side effect*
24. *Lifting weights stunt your growth*	49. *More gear = More muscles*	74. *Only low Testosterone affects sex drive*	99. *Growth hormone causes Carpal Tunnel Syndrome by its effects on connective tissue*
25. *Train like x bodybuilder to look like x*	50. *Overtraining is a myth*	75. *x steroid builds more muscle than x steroid*	100. *MENT as a male contraceptive*

Tier 1: For beginners

1. *Fasting/Cardio kill muscle*

Muscle breakdown during a fast is clearly dependent on the length of the fast, however the effects on muscle breakdown from regular fasts are extremely exaggerated and perpetrated amongst people who are beginning weightlifting. Obviously if you fast for an extended period of time such as 4 days you're going to have some muscle catabolism, however normal shorter fasts (intermittent fasting) are going to have a negligible effect.
Something many people fail to consider is resistance training itself is anti-catabolic. In a study of people with chronic renal insufficiency (a muscle wasting condition), patients were able to maintain muscle mass even on a low protein diet[1], suggesting that resistance training was sufficient to conserve muscle mass when there was a lack of protein available for muscle turnover. Even in extended fasts, light resistance training would likely be sufficient to conserve muscle mass[2].
Cardio doesn't break down muscle in the way people often fear because your body prefers other energy sources. When you do cardio, your body first uses stored glycogen (carbs stored in your muscles and liver) and fat as fuel. Muscle tissue is somewhat a last-resort energy source when these primary fuels are depleted, unless you're running a double marathon.

---

[1] Williamson E, Moore DR. A Muscle-Centric Perspective on Intermittent Fasting: A Suboptimal Dietary Strategy for Supporting Muscle Protein Remodeling and Muscle Mass? Front Nutr. 2021 Jun 9;8:640621. doi: 10.3389/fnut.2021.640621. PMID: 34179054; PMCID: PMC8219935.
[2] Laurens C, Grundler F, Damiot A, Chery I, Le Maho AL, Zahariev A, Le Maho Y, Bergouignan A, Gauquelin-Koch G, Simon C, Blanc S, Wilhelmi de Toledo F. Is muscle and protein loss relevant in long-term fasting in healthy men? A prospective trial on physiological adaptations. J Cachexia Sarcopenia Muscle. 2021 Dec;12(6):1690-1703. doi: 10.1002/jcsm.12766. Epub 2021 Oct 20. PMID: 34668663; PMCID: PMC8718030.

2. *Each exercise needs a preset number of reps*

This myth somewhat ties into myth 17, but you shouldn't, especially when just starting, have a preset number of reps you want to complete for a set. You should aim for progressive overload, adding an extra rep or weight to each lift, which is the fundamental principle of building muscle.

One way to ensure you achieve progressive overload is by training to failure or close to failure on your working sets. As a beginner this should be your main focus before moving onto more advanced programs like periodization training. With that being said, if you're adding an extra rep each week, having a preset number of reps could help you achieve progressive overloading. I'm more focusing on people who pick an arbitrary number of reps for an exercise, i.e. 12 reps on bench press.

3. *Your workout was subpar if your not sore the next day*

More isn't always better, and training until you can't stand isn't necessary, and there's no research that directly ties post-workout soreness to better muscle growth or strength gains. Soreness is just a side effect of intense training, it's not a requirement for muscle growth. Often times soreness is a great indicator your working was good and you hit the muscle effectively, however there are many situations where you might not feel sore but you could still be making progress. The best proxy to know if your workout was subpar is being honest with yourself on if you trained with enough intensely, and thinking critically about if the workout was sufficient for growth.

4. *Deadlifts are 'bad' for your lower back*

The age old myth that the deadlift exercise is inherently bad for your lower back is just that, a myth. So why is it that deadlifts are practically the only exercise the mainstream seems to fearmonger about?
The inherent problem is that deadlifts are one of the easiest lifts to 'ego lift' on because it's one of the easiest to load more weight. It's the illusion of progress that is so enticing, because by altering your deadlift form you can easily add weight on top of your max, however this is what causes the injuries. Deadlifts done correctly, and done with a weight that allows you to continue to use the proper form are perfectly safe, in fact there are studies that show its strengthening of lower back muscles may decrease lower back pain[3].
Clearly, deadlifts don't carry some particular risk, and using incorrect form or a weight out of your capabilities can be dangerous for any exercise.

5. *High volume programs > low volume programs (and Vice versa)*

Making a blanket statement such as, Mike Mentzer's heavy duty program (low volume) or Arnold's high volume program is better for muscle growth, lacks critical thinking, and an understanding of the highly individual response people have to training. You've probably heard previously how genetics are make-or-break if you plan to compete in bodybuilding, and unfortunately (or fortunately if your lucky) this is not a myth.
For instance, most people have either predominantly fast twitch (type 2), or slow twitch (type 1) muscle fibres with the latter being more suited to endurance. To add in extra confusion, the composition of these fibre types varies depending on the muscle group. For instance, most peoples' calf muscles are slow twitch which is why they're considered a 'stubborn muscle'.

---

[3] Berglund L, Aasa B, Hellqvist J, Michaelson P, Aasa U. Which Patients With Low Back Pain Benefit From Deadlift Training? J Strength Cond Res. 2015 Jul;29(7):1803-11. doi: 10.1519/JSC.0000000000000837. PMID: 25559899.

There are many other factors at play here, and boiling it down to simply fast/slow twitch muscle fibres doesn't do your genetic complexity any favors, but it is definitely the most apparent. Understanding your genetics, how your body responds to volume, as well as the size and fibre composition of each muscle group is important to plan how much volume is needed for maximum growth.
For instance your quads are huge muscles and recovery needs to be much longer so therefore they should take on less sets per week.
See what muscle groups are lagging behind, and either lower the volume or increase the volume and see how they respond. This will help you understand how much volume is best for you. A personalised approach is key in bodybuilding and it may be smart to consult a coach to help elucidate what's best for you - See intelligentpersonaltraining.com

6. Using heavyweights is 'dangerous'

When done properly, training with heavier weights with lower reps is perfectly safe. However it's important to pay close attention to how your body feels first. If your joint/tendon aches but still are insistent on training rather than resting, using the lightest weight possible is clearly 'safer'. Using heavyweights is only dangerous when; you ignore how your body feels, or when you lift with incorrect form.
Clearly, using lighter weights will always be safer than heavier weights, however when done correct heavyweights are not inherently dangerous.

7. *If It Fits Your Macros (IIFYM) aka 'All calories are equal'*

Calories in calories out is definitely an accurate statement, and if you're accurately tracking both metrics you will achieve your desired outcome - deficit or surplus. However there are some complexities that make accurate tracking of calories difficult.
For instance; protein consumption has a higher thermic effect than other macronutrients[4], meaning the body burns more calories digesting it. It's hard to track the calories burnt from this process and many people aren't aware of this thus may be in a steeper deficit or lesser surplus then they thought. Zinc, for example, raises IGF-1 levels[5], while iron and vitamin D are associated with insulin sensitivity and metabolic health[6]. Even some non-caloric compounds such as coffee and green tea, can influence metabolism. This is only skimming the surface, and there are many other factors that influence calorie utilization. As you can see, tracking calories accurately can be difficult and simply filling with empty calories because they fit your macros or calorie count ignores the complexity of molecular signaling in your body, and it is always smart to assess micronutrient content and more that is severely lacking in processed foods.
Just to be clear, I'm not denying calories in = calories out, rather that complex bodily processes make tracking true caloric utilisation difficult, so don't blindly follow IIFYM.

---

[4] Halton TL, Hu FB. The effects of high protein diets on thermogenesis, satiety and weight loss: a critical review. J Am Coll Nutr. 2004 Oct;23(5):373-85. doi: 10.1080/07315724.2004.10719381. PMID: 15466943.
[5] Rocha ÉD, de Brito NJ, Dantas MM, Silva Ade A, Almeida Md, Brandão-Neto J. Effect of Zinc Supplementation on GH, IGF1, IGFBP3, OCN, and ALP in Non-Zinc-Deficient Children. J Am Coll Nutr. 2015;34(4):290-9. doi: 10.1080/07315724.2014.929511. Epub 2015 Mar 11. PMID: 25759961.
[6] Contreras-Bolívar V, García-Fontana B, García-Fontana C, Muñoz-Torres M. Mechanisms Involved in the Relationship between Vitamin D and Insulin Resistance: Impact on Clinical Practice. Nutrients. 2021 Oct 1;13(10):3491. doi: 10.3390/nu13103491. PMID: 34684492; PMCID: PMC8539968.

8. *Squats are 'bad for your knees'*

This ties in with the myth about deadlifts and debunking it carries the same message; no exercise is inherently bad, but some are more risky when done incorrectly.
Squats aren't bad for your knees when performed with proper form and without pain. In fact, just like deadlifts, they actually strengthen the area reported to be at risk when done correctly, which in the case of squats is the strengthening of the knee joint and surrounding muscles[7].
If you experience pain during squats, you likely have persisting injuries, are using incorrect form, or have another underlying health issue.
More specifically, people speculate squats deeper than 90 degrees are particularly harmful for the knee. However the science doesn't support this, and actually shows the opposite[8].

9. *Stretching before resistance training prevents injuries*

The idea that stretching before resistance training prevents injuries is a myth.
Static stretching (what we typically refer to as stretching) is where you hold a muscle in a lengthened position for an extended time however this does not effectively prepare your muscles for heavy lifting[9]. A better method to prevent injuries is by starting light with whatever exercise you're planning to do. For instance starting at 10% of your 1 rep max on bench press, before progressing upwards. This will 'warm up' your muscles. Almost every experienced bodybuilding can attest to this. On days where warms up are skipped are almost exclusively where they report to have injuries. Warm ups are not a waste of time and should never be skipped.

---

[7] Li G, Defrate LE, Rubash HE, Gill TJ. In vivo kinematics of the ACL during weight-bearing knee flexion. J Orthop Res. 2005 Mar;23(2):340-4. doi: 10.1016/j.orthres.2004.08.006. Erratum in: J Orthop Res. 2005 Jul;23(4):977. PMID: 15734246.
[8] Li G, Defrate LE, Rubash HE, Gill TJ. In vivo kinematics of the ACL during weight-bearing knee flexion. J Orthop Res. 2005 Mar;23(2):340-4. doi: 10.1016/j.orthres.2004.08.006. Erratum in: J Orthop Res. 2005 Jul;23(4):977. PMID: 15734246.
[9] Witvrouw E, Mahieu N, Danneels L, McNair P. Stretching and injury prevention: an obscure relationship. Sports Med. 2004;34(7):443-9. doi: 10.2165/00007256-200434070-00003. PMID: 15233597.

10. *'Shocking the muscle' rather than progressive overload*

Your muscles don't have a brain. It doesn't understand what exercise you're doing, it can only feel a load placed on it. If you have a routine and each week you're achieving progressive overload, don't just change the routine because you think 'you need to shock the muscle'. One of the only times it makes sense to shock the muscle, is when you've plateaued in the progress of your current routine. Variety is good, but spontaneous changes when you're in a groove may only serve to halt progress.

11. *The infamous 'anabolic window'*

The anabolic window is a famous broscience theory that it's optimal to consume your protein (and carbs) within 2 hours of finishing your workout, with some bros even going as far as saying the workout is wasted if you don't hit the anabolic window. This has been disproved in countless studies, the most famous of which is from 2017 titled 'Pre- versus post-exercise protein intake has similar effects on muscular adaptations'[10].

12. *There is only one correct way to do every movement*

This myth really outlines the importance of a personalised approach to training. A lot of the tips people give to perform a movement are beneficial for sure, however stating there's only one correct way/form to complete a movement completely disregards morphology and body composition.
A famous example is that of squat form. 'Tutorial Videos' will often show squats with feet flat on the floor, however those with longer legs may benefit from adding a plate below their heels

[10] Schoenfeld BJ, Aragon A, Wilborn C, Urbina SL, Hayward SE, Krieger J. Pre- versus post-exercise protein intake has similar effects on muscular adaptations. PeerJ. 2017 Jan 3;5:e2825. doi: 10.7717/peerj.2825. Erratum in: PeerJ. 2017 Aug 1;5:e2825/correction-1. doi: 10.7717/peerj.2825/correction-1. PMID: 28070459; PMCID: PMC5214805.

(heel-elevated squats). It would be in your best interest to have personalised coaching to ensure the movements you are doing are best suited to your body type.

13. Train to failure on every set

Most research indicates that training at 2-3 reps in reserve yields the best results over the course of a training program. Even though most studies were conducted on untrained individuals, the results imply that training to failure is not necessary for optimal growth[11].
As a beginner you should also just stay away from training to failure on every set, because you want to get the hang of things first.

14. You don't need to do anything on rest days for recovery

Light cardio or active recovery activities, like walking, swimming, or cycling, promote blood flow throughout your entire body, which plays a key role in muscle recovery. Improved delivery of nutrients is essential for repairing the microtears caused by training and rebuilding stronger muscle fibers. Improved blood flow also helps 'flush out' waste products like lactic acid + carbon dioxide[12].
Staying active on rest days also enhances nutrient partitioning - improved use of nutrients in your diet. I like to think of it as you 'priming' your body to use food more efficiently. Light activity boosts insulin sensitivity, which is crucial for shuttling glucose and amino acids into muscle cells[13]. This is especially important during bulking phases when you're eating more calories. Insulin resistance in the muscles limits progress.

---

[11] Nóbrega SR, Libardi CA. Is Resistance Training to Muscular Failure Necessary? Front Physiol. 2016 Jan 29;7:10. doi: 10.3389/fphys.2016.00010. PMID: 26858654; PMCID: PMC4731492.
[12] Pittman RN. Regulation of Tissue Oxygenation. San Rafael (CA): Morgan & Claypool Life Sciences; 2011. Chapter 2, The Circulatory System and Oxygen Transport. Available from: https://www.ncbi.nlm.nih.gov/books/NBK54112/
[13] Turcotte LP, Fisher JS. Skeletal muscle insulin resistance: roles of fatty acid metabolism and exercise. Phys Ther. 2008 Nov;88(11):1279-96. doi: 10.2522/ptj.20080018. Epub 2008 Sep 18. PMID: 18801860; PMCID: PMC2579902.

Light movement also helps regulate your metabolism and helps manage appetite. You will also experience less swings in hunger due to stabilised blood glucose levels.

15. Train every muscle with the same volume

As mentioned before in myth 5, most people have a mix of fast-twitch (type 2) and slow-twitch (type 1) fibers, but the ratio varies depending on the individual - and even between muscle groups. Calves are notoriously a ‘stubborn muscle’ which may be due to it being slow-twitch dominant. A famous example of high volume calve training is Arnolds 6 day a week calve training. According to muscle magazines, after training with his idol Reg Park, Arnold began training his calves which had famously been a weak point in the past 6 days a week, and as we know they eventually became a strong point in his physique.
It’s not just about fibre type though. Factors like muscle size, recovery capacity, and workload tolerance also play huge roles in determining how much volume each muscle group needs.

16. Deadlifts will make your waist bigger

The spinal erectors are muscles which run along the length of your back, and are ‘activated’ during deadlifts. As you get stronger and lift heavier weights, these muscles will grow, but they are on your back and thus don't contribute to your waistline. Your abdominal and obliques are ‘activated’ during deadlifts to counter the pull from the spinal erectors, but something people fail to consider is that while it is technically ‘activate’ doesn't necessarily mean the mechanical tension placed on the muscle is significant enough to cause muscular hypertrophy. Golden era guys famously did a high number of deadlift sets each week, and clearly had much smaller waists compared to guys in the modern era. The concern about waist size in modern times is in my opinion likely due to different dietary and pharmaceutical choices.
The potential for deadlifts (and squats) to grow oblique muscles is largely exaggerated and wont grow 99% of peoples waistlines.

17. *Rep list: 1-5 for strength, 6-12 for muscle, >12 for endurance*

When you first got into lifting and health you probably saw a rep list saying; 1-5 for strength, 6-12 for muscle, >12 for endurance. But is this really true? Turns out there is some truth to it but for the most part it is a myth. Strength athletes without a doubt benefit a lot from sticking between 5 or less reps, however for hypertrophy as long as its taken close to failure 5-30 reps seems to recruit similar amounts of muscle growth[14]. However there are some nuances:
5-10 reps: Great for hypertrophy for those with faster twitch fibres. Similar strength gains as 1-5 reps, and probably the keyzone for 'powerbuilders'.
10-20 reps: More than likely the best hypertrophy range for the general population. Recruits all growth pathways, but as significant strength improvements.
20-30 reps: Great hypertrophy rep range for people with slow twitch fibers, and for those looking for joint-friendly training.
Determining which rep range balances your desired goals, and genetics is key for good progress.

18. *Heavy weights/low reps = bulky and;*
19. *Light weights/high reps = toned*

People often refer to 'bulky' and 'toned' as opposing appearances of the muscle, but both refer to how well the muscle is defined (is striations and vascularity is visible). However the rep ranges you chose to primarily engage in has a negligible effect on muscle definition. Muscle definition is influenced by three main factors; the amount of subcutaneous fat covering it (can be improved by losing body fat, or manipulating estrogen levels), the size of the muscle, and fluid retention.

---

[14] Schoenfeld BJ, Grgic J, Ogborn D, Krieger JW. Strength and Hypertrophy Adaptations Between Low- vs. High-Load Resistance Training: A Systematic Review and Meta-analysis. J Strength Cond Res. 2017 Dec;31(12):3508-3523. doi: 10.1519/JSC.0000000000002200. PMID: 28834797.

As discussed above in point 17, rep ranges of 5-30 recruit essentially the same amount of muscle growth amongst the general population, so it's nonsensical that one lifting style will lead to vastly different physiques.

20. Fats/Carbs are 'bad' for you

The idea that either carbs or fats are inherently bad for you is a myth still prevalent in all health and fitness communities, even after an unimaginable amount of contradictory evidence. This myth unfortunately oversimplifies how nutrition actually works. Both macronutrients are essential for your body to function, and villianisim of either misses the bigger picture.

The real problem isn't carbs themselves; its just that carbs tend to be in a refined/processes form (candy, soda, cereals), leading to spikes in blood glucose and problems with insulin resistance when eaten in excess. Keep in mind its possible to maintain your health and still enjoy these refined foods when kept to a minimum. Its recommended to seek personalised care to help reduce how much refined food you eat - see intelligentpersonaltraining.com
While fats are undeniably calorie-dense (9 kcal/g compared to 4 kcal/g for protein and carbs), they're not inherently 'bad' unless you're consistently overeating without balancing your intake. They serve a large variety of roles in the body, particularly natural hormone production which is extremely important in bodybuilding.

21. Soy products cause an estrogen increase

In 2021, researchers conducted a meta-analysis on whether soy products (dietary soy) result in increases in estrogen or lowering of testosterone in men. For those unaware, a meta-analysis is the high quality source of scientific data and ranks at the top of the scientific hierarchy of evidence. This is because they combine data from multiple studies of high quality randomised placebo-controlled clinical trials, providing a broader picture, reducing bias, and increasing statistical power.

The researchers concluded ‘no significant effects of soy protein or isoflavone intake on any of the outcomes measured were found’, and the outcome measures were free and total Testosterone, and estrogen levels (Estradiol/E2 and Estrone/E1) [15].
All other evidence that showed an increase in estrogen were case reports and low quality scientific studies.

22. Vegan/vegetarian diets stunt muscle growth

While vegan and vegetarian diets aren’t exactly optimal for muscle growth because of challenges like lower protein quality (low bioavailability), studies consistently show no significant differences in muscle growth between these diets and omnivorous ones when total protein intake and amino acid profiles are matched[16]. The choice to be a vegan/vegetarian is often made by a person because of their ethical views (whether or not it is ‘ethical’ is irrelevant to this discussion, but there are many good resources online to decide whether or not you consider this diet to be aligned with you ethics), and for the most part is a personal preference that they've made regardless of its impact on muscle growth. However for vegan/vegetarian readers, rest assured it is very possible to put on the same levels of muscle mass relative to other diets, and the only limitation it may have is if you're an aspiring pro bodybuilder. For the average gym-goer this is clearly a myth.

---

[15] Reed KE, Camargo J, Hamilton-Reeves J, Kurzer M, Messina M. Neither soy nor isoflavone intake affects male reproductive hormones: An expanded and updated meta-analysis of clinical studies. Reprod Toxicol. 2021 Mar;100:60-67. doi: 10.1016/j.reprotox.2020.12.019. Epub 2020 Dec 28. PMID: 33383165.
[16] Pohl A, Schünemann F, Bersiner K, Gehlert S. The Impact of Vegan and Vegetarian Diets on Physical Performance and Molecular Signaling in Skeletal Muscle. Nutrients. 2021 Oct 29;13(11):3884. doi: 10.3390/nu13113884. PMID: 34836139; PMCID: PMC8623732.

23. If you eat more than 30g of protein in a meal, your body can't absorb it

A review paper on this subject titled, ‘How much protein can the body use in a single meal for muscle-building? Implications for daily protein distribution’, reviewed all the scientific literature on this topic and concluded:
‘The collective body of evidence indicates that total daily protein intake for the goal of maximizing resistance training-induced gains in muscle mass and strength is approximately 1.6 g/kg, at least in non-dieting (eucaloric or hypercaloric) conditions’. [17]
For a 100kg person that is upwards of 160g of protein per meal, in non-dieting conditions, which is >5x what the myth states for a 100kg person. Even this conclusion, the researchers acknowledge, is not ‘ironclad’ and speculate they believe even more grams of protein per meal can be properly absorbed, indicating that their conclusion may have been conservative.

24. Lifting weights stunt your growth

You likely heard this one from your mother as you were growing up. A review article from 2006 titled ‘Weight training in youth-growth, maturation, and safety: an evidence-based review’[18], reviewed all the evidence on this topic and concluded supervised resistance training did not impact growth and maturation in pre-pubescent and early-pubescent youth.
The only nuance to this was heavy maximal lifting could stunt growth, but this was due to its association with injuries which were the cause of the stunting, not the action of weightlifting itself.

---

[17] Schoenfeld BJ, Aragon AA. How much protein can the body use in a single meal for muscle-building? Implications for daily protein distribution. J Int Soc Sports Nutr. 2018 Feb 27;15:10. doi: 10.1186/s12970-018-0215-1. PMID: 29497353; PMCID: PMC5828430.
[18] Malina RM. Weight training in youth-growth, maturation, and safety: an evidence-based review. Clin J Sport Med. 2006 Nov;16(6):478-87. doi: 10.1097/01.jsm.0000248843.31874.be. PMID: 17119361.

25. Train like x bodybuilder to look like x

Sure you can take training tips and learn valuable insights into how the professionals train which may aid your progress, but following bodybuilders advice blindly is nonsensical.
A classic one is if x bodybuilder has a particularly large muscle group, you need to train that muscle group like x bodybuilder. This approach to training fails to consider a large number of factors:
Every person has different genetics - muscle insertions, body fat distributions, and fibre type ratios per muscle group - that affect which muscle group is their ‘strong point’.
They are likely using gear, whereas you are likely not. Even if you are on gear, they are likely using different compounds at different amounts, and have a professionally tailored schedule for each cycle to maximise outcomes.
Away from science, trying to look like someone else is impossible, and a fool's errand.

Tier 2: Intermediate

26. Supplements are a waste of money / dont make a difference

Two common phrases I hear pertaining to this myth are ‘supplements are just that, supplements to your diet, they’re not necessary’, and ‘supplements are a waste of money’. We’re living in a time where diets are historically bad, so if there was ever a need for dietary supplements its today. Just because they are not technically ‘needed’ doesn't mean they wont help you get an edge. How large that edge is in reality is what you need to determine, and not fall victim to intelligent marketing by supplement companies selling you supplements with a negligible effect.
There are a couple proven supplements; Creatine, Protein Powders, Pre-workouts, and BCAA’s (for reducing the severity of delayed onset muscle soreness). This is not there are others that don't work, but from what I've seen these have been well supported by data.
The most proven supplement, withstanding many studies, is Creatine and it will likely benefit your performance, noticeably.

27. You need to begin incorporating advanced techniques i.e drop sets, super sets etc

Remember, your path to muscular growth is achieved by progressive overload. Advanced techniques can absolutely help you to achieve progressive overload, but they are not necessary. You may want to incorporate them as an intermediate, but they are not necessary, and you may want to stick with the basics for a few years.

28. You need a 'deload' week

A deload week is an effective way to recover from high training fatigue, after training for prolonged periods. However it is not necessary. If you feel you need a week off, as this will also provide you for a mental break needed to not 'burn out' than it is absolutely a smart idea. However for many, like myself, training most days is great for our mental state, and taking a week off might hinder our consistency (if you're a person who enjoys schedules). In this case taking 'active deload' would be beneficial, and lowering intensity and volume by 50% would allow you keep training whilst still having the boost in recovery. Keep in mind the 50% is an arbitrary number and adjust on how much rest you feel you need. This is far from an exact science and listening to how your body feels is the number one rule in weightlifting.
A completely rested deload week is not 'needed' but I would definitely recommend it to those who need a mental break, but for those who need a deload for bodily fatigue I would recommend an active deload.

29. Occasional alcohol consumption wont stunt muscle growth

Hate to break it to you, but even occasional alcohol consumption will stunt muscle growth. However there are nuances to this, and ill provide some tips at the end of the explanation as to how to limit the impact alcohol has on your physique.

When you drink alcohol, your body breaks it down into byproducts that create something called reactive oxygen species (ROS). These are unstable molecules that can damage your cells, a process which you've probably heard of called 'oxidative stress'[19].
Your body subsequently turns on a repair process called autophagy, a cellular process that breaks down damaged components, including the mitochondria. Mitochondria are the powerhouses of your cells - they convert the food you eat into energy + many more processes.
One of the pathways in muscle growth is a protein complex called mTOR (short for mechanistic target of rapamycin). Think of mTOR as your body's growth switch - it helps your muscles grow by regulating hormones like growth hormone and IGF-1 (insulin-like growth factor 1).
Alcohol inhibits mTORC1 on of the two types of mTOR, which means your body can't build muscle as effectively. This is especially problematic for anyone trying to recover after a workout because alcohol blocks the boost in mTORC1 activity that usually happens post-exercise. This occurs regardless of whether your a regular consumer of alcohol[20].
There are also many hormonal pathways beneficial for growth that alcohol lowers such as GnRH, FSH, LH, Testosterone, and increases ACTH leading to increases in aldosterone (increases water retention) and cortisol (leads to muscular catabolism via glucocorticoid receptor)[21] [22].

---

[19] Wu D, Cederbaum AI. Alcohol, oxidative stress, and free radical damage. Alcohol Res Health. 2003;27(4):277-84. PMID: 15540798; PMCID: PMC6668865.
[20] Levitt DE, Luk HY, Vingren JL. Alcohol, Resistance Exercise, and mTOR Pathway Signaling: An Evidence-Based Narrative Review. Biomolecules. 2022 Dec 20;13(1):2. doi: 10.3390/biom13010002. PMID: 36671386; PMCID: PMC9855961.
[21] Emanuele MA, Emanuele NV. Alcohol's effects on male reproduction. Alcohol Health Res World. 1998;22(3):195-201. PMID: 15706796; PMCID: PMC6761906.
[22] Frias J, Torres JM, Miranda MT, Ruiz E, Ortega E. Effects of acute alcohol intoxication on pituitary-gonadal axis hormones, pituitary-adrenal axis hormones, beta-endorphin and prolactin in human

A single night of heavy drinking can block muscle protein synthesis (the creation of new muscle) for up to 12 hours, because of the above mentioned signaling pathways. Whereas consist drinking is going to lead to sustained dysregulation of hormones critical to muscular growth/breakdown.
So for people who aren't regular drinkers and have an occasion, it is recommended to take the next day as a rest day because resistance training will lead to negligible results.
If you're a regular drinker, your results won't be optimal long-term regardless of how you schedule rest days, but the extent of the impact is yet to be seen. Ultimately, it's up to you to weigh the pros and cons and decide how to proceed.

30. If it's only 'slight' joint/tendon pain you can train through it

This particular myth is particularly dangerous and needs to be more widely debunked.
Even if pain feels minor, it is your body's way of signaling that something is off. It could be inflammation, overuse, or poor technique. Ignoring it, especially over a long period, can turn a small issue into a chronic injury.

31. Add extra reps instead of weight for progressive overload

The number one rule to progressive overload is increase the load your muscle experiences, without compromising technique. With that being said, it may be easier to use extra weight then extra reps to progressively overload.
When trying progressively overload, smaller increments of increase are preferential because you simply may add too much and not be able to achieve the extra stimulus. For instance, it would be preferential to add 5kg on your bench press next week rather than 10kg when you're in a surplus.

---

adults of both sexes. Alcohol Alcohol. 2002 Mar-Apr;37(2):169-73. doi: 10.1093/alcalc/37.2.169. PMID: 11912073.

Now say you are benching 80kg for 12 reps, and that is your point of failure. The following week, adding another rep, whilst staying at 80kg, has a total load of 80 x 13 = 1040 kg (this may not be the correct terminology but the point remains). However if you add a 2.5kg plate on each side (5kg increase) and complete 12 reps, the total load experienced is 85 x 12 = 1020 kg, which is a 20kg smaller total load than adding an extra rep, thus is more optimal because it is a small increment.

32. You can outtrain a bad diet

It's possible, but for the average person it's not worth the effort. Say you're trying to be in a 200 kcal deficit to lose some body fat, but in reality your diet you end up in a 300 kcal surplus every day. Burning 500 kcal to make up for this close to an hour on the step master for the average person. Over the course of the week this is 7 hours of extra cardio - almost a full day of work. Additionally, all calories aren't made equal. As mentioned before, protein is the most thermogenic macronutrient, and a diet with sufficient protein will help you remain in a surplus if that is your goal. Protein is also undeniably more satiating than other macronutrients, meaning you'll feel less hunger if you have adequate protein intake[23]. Satiety you get from protein and fibre - typically found in ‘healthier’ foods - will help you sustainably maintain a healthy body fat percentage or reach a healthier body fat percentage, through satiety signaling, and undoubtedly be much healthier and time efficient than trying to out train a bad diet. This doesn't mean your food has to be bland, and you can still consume ‘enjoyable’ foods and remain in a deficit, see cookbooks available at intelligentpersonaltraining.com

[23] Paddon-Jones D, Westman E, Mattes RD, Wolfe RR, Astrup A, Westerterp-Plantenga M. Protein, weight management, and satiety. Am J Clin Nutr. 2008 May;87(5):1558S-1561S. doi: 10.1093/ajcn/87.5.1558S. PMID: 18469287.

33. *It doesn't matter what time of day you train*

This myth can easily be debunked with 5 minutes of research into our bodies circadian rhythm. Weightlifting obviously increases noradrenaline (norepinephrine) levels, and unfortunately these levels can remain elevated for a period of time after the workout. This can disrupt sleep, especially if the workout is done close to bedtime. The further the workout is from your bedtime, the less likely it is to impact your sleep. However it can be difficult to workout before a work day, so what can I do? Try to see if you can fit your workout in, or at least part of it, during lunch break. Try to workout straight after work if it's not possible.
Testosterone levels are also highest within 3 hours of waking up[24], and begin to fall afterwards. Having higher testosterone levels during the workout helps intensity, which is why many professional bodybuilders take certain types of steroids as a pre-workout.
On the other hand, some people feel stronger and more alert later in the day which may contribute to a better workout. Ultimately, you should try to see whether a certain time of day helps the intensity of your workout, and if it's convenient stick to that time. Based on factors from the circadian rhythm it is probably optimal to workout in the morning, but this is not an exact science, and you should make the decision based on what works best for you.

34. *Forearms and calves are 100% genetic and can't be grown*

This is far from the case, and essentially every person who has worked out for 3+ years can attest to the fact that consistent training of forearms and calves will definitely lead to growth. Don't worry you're not cursed with stick legs or tiny forearms forever. Both are notoriously ‘stubborn muscle groups’ and need consistent training and high volume. Try different variations of calf raises, and forearm curls if your current training isn't leading to growth over an extended period of time.

---

[24] Gall H, Glowania HJ, Fischer M. Circadiane Rhythmik des Plasmatestosteronspiegels. I. Physiologische Schwankungen des Plasmatestosteronspiegels innerhalb von 24 h [Circadian rhythm of testosterone level in plasma. I. Physiologic 24-hour oscillations of the testosterone level in plasma]. Andrologia. 1979 Jul-Aug;11(4):287-92. German. PMID: 496034.

If they continue to lag behind book a consultation at intelligentpersonaltraining.com

35. Do your cardio after you lift

Doing your cardio after you lift is not optimal, but neither is doing your cardio before you lift. Doing both at separate times of the day is far superior, or simply prioritising cardio on rest days for the benefits of active recovery described in myth 14.
However if you have time constraints that impede this, yes do the cardio after lifting. Do not do intense cardio sessions on days where you are training stubborn/lagging muscle groups as this may further impede growth. Try to do your cardio on rest days as much as possible.

36. You need to do fasted cardio

The evidence about fasted cardio is conflicted, so it is not a necessity.
According to a study titled, 'Exercising fasting or fed to enhance fat loss? Influence of food intake on respiratory ratio and excess postexercise oxygen consumption after a bout of endurance training', researchers found that whilst the respiratory exchange ratio (RER) showed that more fat was burned during a fasted state, non-fasted group used significantly more fat for fuel for up to 24 hours after the cardio[25].
On the other side of the coin, a study titled, 'The Effects of Six Weeks of Fasted Aerobic Exercise on Body Shape and Blood Biochemical Index in Overweight and Obese Young Adult Males', found that although both lead to similar amounts of weight loss over 6 weeks, fasted cardio improved tissue insulin sensitivity more compared to non-fasted cardio[26]. Keep in mind

---

[25] Paoli A, Marcolin G, Zonin F, Neri M, Sivieri A, Pacelli QF. Exercising fasting or fed to enhance fat loss? Influence of food intake on respiratory ratio and excess postexercise oxygen consumption after a bout of endurance training. Int J Sport Nutr Exerc Metab. 2011 Feb;21(1):48-54. doi: 10.1123/ijsnem.21.1.48. PMID: 21411835.
[26] Liu X, He M, Gan X, Yang Y, Hou Q, Hu R. The Effects of Six Weeks of Fasted Aerobic Exercise on Body Shape and Blood Biochemical Index in Overweight and Obese Young Adult Males. J Exerc Sci Fit.

this is in obese populations, and may not lead to different changes in insulin sensitivity in populations with regular body fat percentages.
It's important to note that many bodybuilders do fasted cardio, so if I had to speculate whether it was beneficial I'd say yes, but in regards to scientific evidence this remains to be seen, and for that reason it is definitely not a necessity.

37. Bulking for over a year

I've seen Intermediates and even some advanced groups in gym communities recommend to so-called 'hard gainers', who are looking to pack on muscle fast, to bulk for an extended period such as a year. What these people fail to consider is that after a certain period, a calorie surplus has diminishing returns in regards to muscle growth. Why? For a few reasons:
Regardless of how 'clean' your bulk is, you're going to put on some amount of fat, and obviously the more conservative the surplus the less fat. However a surplus for a year long is going to lead to a bigger increase in body fat percentage than the same surplus over 4 months. But does this matter if you're just going to burn it off during the cut? Yes, the higher your body fat percentage, the higher your insulin resistance, which significantly impedes muscle growth [27] [28]. Insulin is the main anabolic hormone in your body, so clearly an increase in insulin resistance is very detrimental for hypertrophy.

2023 Jan;21(1):95-103. doi: 10.1016/j.jesf.2022.11.003. Epub 2022 Nov 11. PMID: 36447628; PMCID: PMC9674552.
[27] Ostler JE, Maurya SK, Dials J, Roof SR, Devor ST, Ziolo MT, Periasamy M. Effects of insulin resistance on skeletal muscle growth and exercise capacity in type 2 diabetic mouse models. Am J Physiol Endocrinol Metab. 2014 Mar;306(6):E592-605. doi: 10.1152/ajpendo.00277.2013. Epub 2014 Jan 14. PMID: 24425761; PMCID: PMC3948983.
[28] Preethi Srikanthan, Arun S. Karlamangla, Relative Muscle Mass Is Inversely Associated with Insulin Resistance and Prediabetes. Findings from The Third National Health and Nutrition Examination Survey, The Journal of Clinical Endocrinology & Metabolism, Volume 96, Issue 9, 1 September 2011, Pages 2898–2903, https://doi.org/10.1210/jc.2011-0435

The higher your body fat percentage, the more muscle protein turnover is negatively impacted[29]. Most bodybuilding coaches recommend fluctuating between 10-15% during a bulk and a cut, however some men simply function (mental and physical energy) between between 15-20% body fat percentage and if going below that is going to diminish your quality of life it isn't worth the likely small benefits on body composition.
Regardless, even if you're in a conservative surplus, if it's for over a year you're certainly going to exceed 20% and likely go beyond 25%. You're going to experience diminishing returns, and the portion of muscle to fat gain after ~20% is unfavorable. However I acknowledge that a very small portion of people, such as those who are extremely frail, may benefit more from a year long bulk than say 6 months.
Ultimately, a prolonged bulk, such as a year long bulk, is counterproductive for almost all individuals.

38. The appearance of your abs is 100% genetic

Many people claim the reason they could never compete is they have an unaesthetic ab shape, and that this is completely genetic. However you can manipulate your body fat percentage, and abdominal mass to change how aesthetic they appear. For example, some individuals may benefit from targeting the lower abdominals, making them more visible when body fat is kept the same. Additionally, many individuals simply haven't gotten to a low enough body percentage to see the true shape of their abdominal muscles.

[29] Beals JW, Burd NA, Moore DR, van Vliet S. Obesity Alters the Muscle Protein Synthetic Response to Nutrition and Exercise. Front Nutr. 2019 Jun 13;6:87. doi: 10.3389/fnut.2019.00087. PMID: 31263701; PMCID: PMC6584965.

39. Lean gaining or main gaining are more effective than bulking

A common proponent of this myth is Greg Doucette. In some ways he's right, lean gaining or main gaining are far superior for overall health, and I admire the fact he promotes healthier eating practices amongst bodybuilding circles. However when it comes to purely muscle growth, it is not more effective.
Calorie surpluses affect many growth signaling pathways, with the most notable and well known being Insulin-like Growth Factor 1 (IGF-1). When eating at maintenance or in a slight surplus, your simply not increasing IGF-1 levels conducive to significant growth. With that being said, too large of a surplus, seen in ‘dirty bulks’, leads to diminishing returns quite fast - see myth 37. By eating at a moderate surplus you are gaining significantly more muscle mass, with still a relatively low fat gain, which you can then burn off more efficiently because by simply having more muscle mass you will have a greater basal metabolic rate. So what is this sweet spot of caloric surplus? It seems to be around 300 kcal, and done for about 3 months. Keep in mind this is an arbitrary rule, and although it will be effective for the general populous, make sure to adjust based on the way your body feels.

40. Free weights are better than machines (and vice versa)

Your muscles don't have a mind of their own, the only thing they can feel is the total stress they are placed under. They don't know whether the stress is coming from a machine or from free weights, so there is no inherent muscle building quality one has over the other. Whether you use machines or free weights, as long as you train with intensity and a sufficient amount of volume for each muscle group, paired with sufficient rest and food, you're going to achieve your maximum natural potential.

41. __ split is better than __ split

Science has shown there to be no difference in muscle built between different splits. A recent 2024 meta analysis titled 'Efficacy of Split Versus Full-Body Resistance Training on Strength and Muscle Growth: A Systematic Review With Meta-Analysis' found no difference amongst split and full body routines and concluded "individuals are free to confidently select a resistance training routine based on their personal preferences"[30]. The best split for you is the split that allows you to stay the most consistent and fits best within your other responsibilities - i.e school, work, or training. It might be ideal to design a split that maximises volume on so called 'weak' muscle groups. For instance say you had a lagging chest, you might want to design a split that maximizes chest volume.

42. You're going to lose muscle after 2 weeks of not training

There are many studies that show varying results about muscle catabolism after cessation of resistance training. Resistance exercise will improve both muscle protein fractional synthesis rate and satellite cell content. Data has shown that the number of satellite cells per muscle fibre remains elevated up to 60 days after detraining, and declines after 90 days[31]. After reviewing 6 studies, a 2022 meta-analysis titled 'Use It or Lose It? A Meta-Analysis on the Effects of Resistance Training Cessation (Detraining) on Muscle Size in Older Adults' researchers speculated that "muscle size is relatively preserved over shorter detraining periods (e.g., 2 weeks)".

---

[30] Ramos-Campo DJ, Benito-Peinado PJ, Andreu-Caravaca L, Rojo-Tirado MA, Rubio-Arias JÁ. Efficacy of Split Versus Full-Body Resistance Training on Strength and Muscle Growth: A Systematic Review With Meta-Analysis. J Strength Cond Res. 2024 Jul 1;38(7):1330-1340. doi: 10.1519/JSC.0000000000004774. Epub 2024 Apr 9. PMID: 38595233.

[31] Kadi F, Schjerling P, Andersen LL, Charifi N, Madsen JL, Christensen LR, Andersen JL. The effects of heavy resistance training and detraining on satellite cells in human skeletal muscles. J Physiol. 2004 Aug 1;558(Pt 3):1005-12. doi: 10.1113/jphysiol.2004.065904. Epub 2004 Jun 24. PMID: 15218062; PMCID: PMC1665027.

The main reason why many lifters believe that muscle catabolism can occur in such a small time period is because they may perceive the lack of localised swelling and inflammation ‘the pump’ from training to be muscle tissue, and its absence may be perceived as a lose of muscle. Although it's possible some catabolism can occur during 2 weeks of detraining, it's likely to be negligible. It's quite common for top level bodybuilders to take 2 weeks off training each year, but to be fair there are other factors for why they do this.

43. Gaining pounds of muscle in a week using <Insert supplement>

No supplement will help increase muscle mass within a week of administration even with training. Creatine is by far the most effective supplement. Although studies with creatine have shown increases in lean body mass within a week of creatine supplementation, this is due to water weight and not pure contractile tissue. Only certain performance enhancing drugs could have this effect.

44. Muscle density

Many intermediates believe muscle’s have a certain density to them that can be acquired from different types of training. However this is just a prescription of ‘muscle definition’. Mentioned in myth 18/19 muscle definition is affected by 3 factors; the amount of subcutaneous fat covering it (can be improved by losing body fat, or manipulating estrogen levels), the size of the muscle, and fluid retention.
Dorian Yates famously said that he believes his heavy duty training style was key for him building such dense muscle. However it is impossible to increase muscle density.
There are two types of muscle hypertrophy, myofibrillar (growth of contractile proteins) and sarcoplasmic (increase in non-contractile elements). However the difference in their ratios (after the initial months of resistance training) from using different rep ranges tends to even out over

time. Ultimately, training heavier won't lead to different ratios over time. Growth hormone/IGF-1 has been shown to induce hyperplasia[32] so there is potential there but this isn't well researched.

45. High protein diets harm the kidneys

The two biggest risk factors for kidney failure are diabetes (insulin resistance) and high blood pressure (hypertension). Protein has been shown to be antihypertensive (lowers blood pressure) [33] and high protein diets have been shown to better for insulin resistance [34].
Additionally a 2018 meta analysis titled ‘Changes in Kidney Function Do Not Differ between Healthy Adults Consuming Higher- Compared with Lower- or Normal-Protein Diets: A Systematic Review and Meta-Analysis’ found that high protein diets did not affect kidney function[35]. However researchers acknowledged there was a “unclear risk of selection bias of the included trials”.
More notably a 2024 meta analysis titled ‘Association between dietary protein intake and risk of chronic kidney disease: a systematic review and meta-analysis’, had a better study design actually concluded that ‘showed a lower CKD risk significantly associated higher-level dietary total, plant or animal protein (especially for fish and seafood) intake’.

---

[32] Yoshida T, Delafontaine P. Mechanisms of IGF-1-Mediated Regulation of Skeletal Muscle Hypertrophy and Atrophy. Cells. 2020 Aug 26;9(9):1970. doi: 10.3390/cells9091970. PMID: 32858949; PMCID: PMC7564605.
[33] Vasdev S, Stuckless J. Antihypertensive effects of dietary protein and its mechanism. Int J Angiol. 2010 Spring;19(1):e7-e20. doi: 10.1055/s-0031-1278362. PMID: 22477579; PMCID: PMC2949991.
[34] Tettamanzi F, Bagnardi V, Louca P, Nogal A, Monti GS, Mambrini SP, Lucchetti E, Maestrini S, Mazza S, Rodriguez-Mateos A, Scacchi M, Valdes AM, Invitti C, Menni C. A High Protein Diet Is More Effective in Improving Insulin Resistance and Glycemic Variability Compared to a Mediterranean Diet-A Cross-Over Controlled Inpatient Dietary Study. Nutrients. 2021 Dec 7;13(12):4380. doi: 10.3390/nu13124380. PMID: 34959931; PMCID: PMC8707429.
[35] Devries MC, Sithamparapillai A, Brimble KS, Banfield L, Morton RW, Phillips SM. Changes in Kidney Function Do Not Differ between Healthy Adults Consuming Higher- Compared with Lower- or Normal-Protein Diets: A Systematic Review and Meta-Analysis. J Nutr. 2018 Nov 1;148(11):1760-1775. doi: 10.1093/jn/nxy197. PMID: 30383278; PMCID: PMC6236074.

As you can see a high protein diet isn't harmful to your kidneys, and may in fact lead to less Chronic Kidney Disease.

46. The importance of carb timing

The importance of carb timing is largely overstated. As long as your muscles have somewhat full glycogen stores, your not going to have significantly more energy if you eat carbs 30 minutes before the workout. The only nuance to this is if the feeling of hunger diminishes the quality of your workout. This is something I experienced myself. Having a moderate sized satiating meal an hour before the gym helped stop this.
Glycogen, which can be stored in the muscles and liver, provide the primary energy source for high-intensity workouts. If your glycogen stores are already full from prior meals, eating carbs right before the gym has minimal impact on energy availability. Glycogen depletion is more relevant for long-duration or highly intense exercise sessions. As long as you're getting in carbohydrates before and after the workout the timing doesn't particularly matter. Eating carbs 3 hours before the workout will have a similar impact as carbs eaten 30 minutes before. If glycogen levels are sufficient, eating pre-workout carbs 30 minutes before gym wont have a drastic difference.

47. Creatine is bad for your kidneys

No, Creatine is not bad for your kidneys. Creatine, aside from its performance enhancing effects, has a lot of pro-health impacts. Creatine is neuroprotective to the point where it has been explored as a treatment for Parkinson's disease[36], providing noticeable but not clinically

[36] Bender A, Koch W, Elstner M, Schombacher Y, Bender J, Moeschl M, Gekeler F, Müller-Myhsok B, Gasser T, Tatsch K, Klopstock T. Creatine supplementation in Parkinson disease: a placebo-controlled randomized pilot trial. Neurology. 2006 Oct 10;67(7):1262-4. doi: 10.1212/01.wnl.0000238518.34389.12. PMID: 17030762.

applicable benefits, and also the treatment of traumatic brain injury[37] [38] [39]. It has also been shown to be cardioprotective (healthy for the heart) and even beneficial in heart function[40]. A meta analysis from 2019 titled 'Effects of Creatine Supplementation on Renal Function: A Systematic Review and Meta-Analysis' found that when taken in recommended dosages[41] (10-20g till your muscles are saturated then 5g for maintenance). Proponents of the myth Creatine is bad for the kidneys are often confusing it with a similar sounding word 'Creatinine' which is a by-product of normal kidney function and has nothing to do with Creatine supplementation.

48. Creatine will cause hair loss

Almost every guy has heard this after bringing up the idea of starting creatine, "You know it'll give you hair loss right bro". Wrong, it doesn't impact hair loss at all. For those unaware, the cause of androgenic alopecia (mens hair loss) is DHT/Dihydrotestosterone (a potent male sex hormone) from binding to the androgen receptor of the scalp, and transcribing effects leading to its eventual death.

---

[37] Pender SC, Smith AM, Finnoff JT, Huston J 3rd, Stuart MJ. Concussions in Ice Hockey - Moving Toward Objective Diagnoses and Point-of-care Treatment: A Review. Curr Sports Med Rep. 2020 Sep;19(9):380-386. doi: 10.1249/JSR.0000000000000752. PMID: 32925378.
[38] Kreider RB, Stout JR. Creatine in Health and Disease. Nutrients. 2021 Jan 29;13(2):447. doi: 10.3390/nu13020447. PMID: 33572884; PMCID: PMC7910963.
[39] Giza CC, Hovda DA. The new neurometabolic cascade of concussion. Neurosurgery. 2014 Oct;75 Suppl 4(0 4):S24-33. doi: 10.1227/NEU.0000000000000505. PMID: 25232881; PMCID: PMC4479139.
[40] Balestrino M. Role of Creatine in the Heart: Health and Disease. Nutrients. 2021 Apr 7;13(4):1215. doi: 10.3390/nu13041215. PMID: 33917009; PMCID: PMC8067763.
[41] de Souza E Silva A, Pertille A, Reis Barbosa CG, Aparecida de Oliveira Silva J, de Jesus DV, Ribeiro AGSV, Baganha RJ, de Oliveira JJ. Effects of Creatine Supplementation on Renal Function: A Systematic Review and Meta-Analysis. J Ren Nutr. 2019 Nov;29(6):480-489. doi: 10.1053/j.jrn.2019.05.004. Epub 2019 Jul 30. PMID: 31375416.

This myth stemmed from a study titled ‘Three weeks of creatine monohydrate supplementation affects dihydrotestosterone to testosterone ratio in college-aged rugby players’ [42]. However there were significant flaws in quality in this study.
The baseline DHT in the creatine group was 23% lower than the placebo group, so obviously if either group was going to see an increase in natural fluctuation it is that group.
The DHT levels in the placebo group actually went down as well, does that mean that choosing not to take creatine will decrease DHT? Obviously not. The study just had methodology flaws which makes any conclusion unreliable, and also had a small sample size of 16.
A review article titled ‘Common questions and misconceptions about creatine supplementation: what does the scientific evidence really show?’[43], reviewed 12 studies on creatine’s effects on testosterone levels (a precursor to Dihydrotestosterone), and concluded ‘the current body of evidence does not indicate that creatine supplementation increases total testosterone, free testosterone, DHT or causes hair loss/baldness.’
Even if Creatine did increase testosterone levels it doesn't necessarily mean your level of DHT will increase. You may already have a high conversion of Testosterone to DHT via the 5 alpha reductase enzyme in the scalp, so any extra Testosterone wouldn't even contribute to increases in DHT. Even if it did end up increasing DHT you may not even have a genetic predisposition to hair loss.

49. More gear = More muscles

Technically speaking this is true, however what intermediates don’t realise is that anabolic-androgenic steroids begin to have diminishing returns. Its well accepted 500-600mg per week of exogenous Testosterone (100mg range because of individual genetic responses), meaning that even though doses over 600 mg still continued to promote muscle growth the

[42] van der Merwe J, Brooks NE, Myburgh KH. Three weeks of creatine monohydrate supplementation affects dihydrotestosterone to testosterone ratio in college-aged rugby players. Clin J Sport Med. 2009 Sep;19(5):399-404. doi: 10.1097/JSM.0b013e3181b8b52f. PMID: 19741313.
[43] van der Merwe J, Brooks NE, Myburgh KH. Three weeks of creatine monohydrate supplementation affects dihydrotestosterone to testosterone ratio in college-aged rugby players. Clin J Sport Med. 2009 Sep;19(5):399-404. doi: 10.1097/JSM.0b013e3181b8b52f. PMID: 19741313.

gains are progressively smaller relative to the dose. This doesn't even factor in side effects, which will change what the point of diminishing returns is for each individual person, this purely just from a muscle growth perspective.
The mythology of this relates to the common belief if one user is bigger than another they simply must be taking more gear. This is not necessarily the case.
In a study titled 'Testosterone dose-response relationships in healthy young men'[44], FFM (fat-free mass) increased dose dependently in 125, 300, or 600 mg of testosterone weekly, +3.4, 5.2, and 7.9 kg, respectively.
The 600mg group only added 2.3x as much LBM as the 125mg group, but were taking 4.8x more testosterone than the 125mg group. As a result the point of diminishing returns in terms of muscle mass is likely around 500mg per week. Keep in mind, the study controlled nutrient intake and used pharmaceutical grade Testosterone for all groups - researchers controlled variables.

50. Overtraining is a myth

No, overtraining is far from a myth. There are two sides to the debate about overtraining. Typically the science-based side preaches that after a certain amount of sets - usually stated around 20 sets per week per muscle - you begin to recruit more fatigue than you can recover from.
Whereas bodybuilding romantics like to preach overtraining is a myth - which ironically is itself a myth in my opinion - and that the more volume you experience the better growth you'll have.
Like with almost every subject of debate, the answer will more than likely lie close to the middle. Overtraining is definitely not a myth, and it's possible that you recruit enough fatigue that your body isn't able to recover as optimally as it would with less volume, and thus result in less growth.

---

[44] Bhasin S, Woodhouse L, Casaburi R, Singh AB, Bhasin D, Berman N, Chen X, Yarasheski KE, Magliano L, Dzekov C, Dzekov J, Bross R, Phillips J, Sinha-Hikim I, Shen R, Storer TW. Testosterone dose-response relationships in healthy young men. Am J Physiol Endocrinol Metab. 2001 Dec;281(6):E1172-81. doi: 10.1152/ajpendo.2001.281.6.E1172. PMID: 11701431.

Tier 3: Advanced/professional

51. DHT-derivatives are the worst steroids for hair loss (speed up Androgenic Alopecia the most)

Converse to what you'd think, anabolic-androgenic steroids derived from DHT are not the worst steroids for hair loss, and most appear to be 'hair-safe'. Of course no anabolic-androgenic steroid is 'hairsafe' and will lead to more hair loss then androgen levels during natural testicular function, but DHT derivatives are relatively more safe than other steroids (Testosterone derivatives and 19-nortestosterone derivatives).
The accepted theory for this is, 5 alpha reductase tends to convert androgens into a more potent metabolite however as this class of steroids are derived from DHT they aren't a substrate for 5 alpha reductase and thus can't be converted into a more potent form.

52. Only oral anabolic steroids are bad for your liver

While many associate this risk primarily with oral steroids, the truth is that injectable steroids can also pose a threat to liver health. The key factors to consider are the androgenicity of the steroid and its rate of metabolism. Androgenicity refers to the strength of a steroid's binding affinity to androgen receptors in the body. The higher the androgenic potential and the slower the metabolism, the greater the potential for liver damage.
Oral steroids are often modified to slow down their metabolism, making them more effective but also potentially more harmful. This modification, known as alpha 17 alkylation, allows the steroids to remain in the body longer, but it also increases the burden on the liver, leading to damage[45]. However, even injectable steroids, especially those with long esters that remain in the system for extended periods, can cause similar damage if they are highly androgenic.

---

[45] Niedfeldt MW. Anabolic Steroid Effect on the Liver. Curr Sports Med Rep. 2018 Mar;17(3):97-102. doi: 10.1249/JSR.0000000000000467. PMID: 29521706.

The damage caused by anabolic steroids is not always immediately apparent. While liver enzyme values may decline after stopping steroid use, the underlying DNA damage at the liver can persist for years, potentially leading to liver cancer even decades later. This delayed effect underscores the importance of understanding the long-term risks associated with steroid use.
One particularly concerning condition linked to anabolic steroid use is hepatocellular carcinoma (HCC), the most common form of liver cancer[46]. Research has shown that androgen receptor density at the liver is correlated with the development of HCC[47]. This finding is so significant that even individuals who haven't used steroids but have HCC are looking for ways to reduce androgen receptor density in their livers.
It's important to note that the risk of developing HCC is not limited to high doses of steroids. Studies have shown that similar doses of androgens can cause both liver tumors (adenomas) and HCC[48], and the median time to develop either condition is around five and a half years of consistent steroid use. This finding emphasizes that even moderate steroid use over an extended period can have serious consequences.
So, how can one protect their liver while using anabolic steroids? While completely eliminating the risk is impossible, there are steps that can be taken to mitigate the potential damage. Antioxidants, such as milk thistle, choline, TUDCA, coenzyme q10, have been shown to improve metrics in liver function tests and thus might attenuate liver damage from anabolic steroids or act as ancillaries. Additionally, maintaining a healthy lifestyle, including a balanced diet, regular exercise, and especially avoiding alcohol, is crucial for overall liver health.
It's also important to remember that cycling off steroids, meaning taking breaks from their use, may not completely eliminate the risk of liver damage. While some cellular repair and apoptosis

---

[46] Johnson FL, Lerner KG, Siegel M, Feagler JR, Majerus PW, Hartmann JR, Thomas ED. Association of androgenic-anabolic steroid therapy with development of hepatocellular carcinoma. Lancet. 1972 Dec 16;2(7790):1273-6. doi: 10.1016/s0140-6736(72)92649-9. PMID: 4117807.
[47] Kanda T, Jiang X, Yokosuka O. Androgen receptor signaling in hepatocellular carcinoma and pancreatic cancers. World J Gastroenterol. 2014 Jul 28;20(28):9229-36. doi: 10.3748/wjg.v20.i28.9229. PMID: 25071315; PMCID: PMC4110552.
[48] Ielasi, L.; Fulco, E.; Reggidori, N.; Domenicali, M.; Foschi, F.G. Anabolic Androgenic Steroids and Hepatocellular Adenoma and Carcinoma: Molecular Mechanisms and Clinical Implications. Gastroenterol. Insights 2024, 15, 599-613. https://doi.org/10.3390/gastroent15030044

(essentially programmed cell death) will occur during these breaks, the long-term effects of repeated steroid cycles are still not fully understood.

53. Using TRT is healthier than having low Testosterone levels

This myth is commonly hinted at, or outright stated by those with incentives, i.e. affiliates of cookie-cutter TRT clinics, or misinformed people. Just to be clear, I don't condemn, or judge those who use TRT or other AAS' and TRT clinics, as I believe in bodily freedom, but I disagree with the misinformation about TRT.
Its undeniable that in large groups of men, especially those aging, TRT can improve quality of life, however from a longevity-perspective of health it is definitely not.
For those who have Testosterone levels within normal ranges for their age-bracket, therapeutic-increases won't increase longevity[49]. At the end of the day, Testosterone production may be declining with age for a reason, i.e. its reduction reduces x risk. Whether or not TRT for men with genuine below normal levels will improve longevity is conflicted within studies.
From medical evidence, the only clinical scenario where TRT *may* improve longevity is amongst those who suffer from metabolic syndrome[5051].

---

[49] Grech A, Breck J, Heidelbaugh J. Adverse effects of testosterone replacement therapy: an update on the evidence and controversy. Ther Adv Drug Saf. 2014 Oct;5(5):190-200. doi: 10.1177/2042098614548680. PMID: 25360240; PMCID: PMC4212439.
[50] Li SY, Zhao YL, Yang YF, Wang X, Nie M, Wu XY, Mao JF. Metabolic Effects of Testosterone Replacement Therapy in Patients with Type 2 Diabetes Mellitus or Metabolic Syndrome: A Meta-Analysis. Int J Endocrinol. 2020 Sep 30;2020:4732021. doi: 10.1155/2020/4732021. PMID: 33061966; PMCID: PMC7545471.
[51] Gonzalez-Gil AM, Barnouin Y, Celli A, Viola V, Villarreal MD, Duremdes Nava ML, Sciuk A, Qualls C, Armamento-Villareal R, Villareal DT. Metabolic effects of testosterone added to intensive lifestyle intervention in older men with obesity and hypogonadism. J Clin Endocrinol Metab. 2024 Apr 12:dgae249. doi: 10.1210/clinem/dgae249. Epub ahead of print. PMID: 38606934; PMCID: PMC11470114.

54. Anabolic steroids are not that nephrotoxic

All androgens themselves are nephrotoxic, and whilst Trenbolone, and Winstrol are very much so, even testosterone is also nephrotoxic when taken in Supratherapeutic doses. The common belief is that only certain androgen derivatives pose a risk to kidney health, and i've even seen some people say that high protein consumption is more nephrotoxic relative to anabolics. Currently, there are 35 case studies on kidney injury, damage, or failure amongst anabolic steroid users, with many of the case studies following more than one person. For example the study titled 'Development of focal segmental glomerulosclerosis after anabolic steroid abuse' [52]follows 10 bodybuilders. Individuals suffered from glomerular sclerosis (scarring of the glomeruli, the filtering units in the kidneys) in these individuals. When kidneys are overstressed, they undergo hypertrophy (enlargement) to cope with the increased filtration demands[53]. This hypertrophy can lead to detachment of podocytes (cells in the glomeruli) from other kidney structures, eventually resulting in scarring.
Interestingly, the researchers noticed that while six out of ten participants had moderate hypertension, they did not exhibit significant arteriosclerosis (hardening of the arteries) in their kidneys, which led them to believe that while high blood pressure contributes to kidney damage, the primary culprit in this case was likely the direct toxicity of androgens on the kidneys.

---

[52] Herlitz LC, Markowitz GS, Farris AB, Schwimmer JA, Stokes MB, Kunis C, Colvin RB, D'Agati VD. Development of focal segmental glomerulosclerosis after anabolic steroid abuse. J Am Soc Nephrol. 2010 Jan;21(1):163-72. doi: 10.1681/ASN.2009040450. Epub 2009 Nov 16. PMID: 19917783; PMCID: PMC2799287.
[53] Schnaper HW. Remnant nephron physiology and the progression of chronic kidney disease. Pediatr Nephrol. 2014 Feb;29(2):193-202. doi: 10.1007/s00467-013-2494-8. Epub 2013 May 29. PMID: 23715783; PMCID: PMC3796124.

55. Using myostatin inhibitors with a cycle

Myostatin has been shown, primarily in animals, to be a protein that inhibits muscle growth. Myostatin inhibitors are commonly used within a cycle as recreational users commonly believe Steroids increase myostatin levels. However this is not necessarily the case. In a study titled 'Time course of changes in growth factor mRNA levels in muscle of steroid-implanted and nonimplanted steers' researchers found that trenbolone acetate implants did not affect myostatin levels in the skeletal muscles of steers[54]. In another study titled 'Nandrolone Normalizes Determinants of Muscle Mass and Fiber Type after Spinal Cord Injury' researchers noted that "The mRNA levels for myostatin were not altered in muscle after SCI and were unaffected by testosterone or nandrolone administration" [55].

Contradictorily, a study titled 'Androgens negatively regulate myostatin expression in an androgen-dependent skeletal muscle' found that Testosterone treatment reduced myostatin levels to normal values[56].

Clearly, if steroids did in fact increase myostatin levels, the amount wouldn't be that significant. What many fail to consider is that resistance training itself reduces myostatin levels. A 2023 meta-analysis titled 'The effects of resistance training on myostatin and follistatin in adults: A systematic review and meta-analysis' concluded that "Resistance training in adults is effective for reducing myostatin" [57].

---

[54] Pampusch MS, Johnson BJ, White ME, Hathaway MR, Dunn JD, Waylan AT, Dayton WR. Time course of changes in growth factor mRNA levels in muscle of steroid-implanted and nonimplanted steers. J Anim Sci. 2003 Nov;81(11):2733-40. doi: 10.2527/2003.81112733x. PMID: 14601876.

[55] Wu Y, Zhao J, Zhao W, Pan J, Bauman WA, Cardozo CP. Nandrolone normalizes determinants of muscle mass and fiber type after spinal cord injury. J Neurotrauma. 2012 May 20;29(8):1663-75. doi: 10.1089/neu.2011.2203. Epub 2012 Apr 16. PMID: 22208735; PMCID: PMC5364642.

[56] Mendler L, Baka Z, Kovács-Simon A, Dux L. Androgens negatively regulate myostatin expression in an androgen-dependent skeletal muscle. Biochem Biophys Res Commun. 2007 Sep 14;361(1):237-42. doi: 10.1016/j.bbrc.2007.07.023. Epub 2007 Jul 16. PMID: 17658471.

[57] Khalafi M, Aria B, Symonds ME, Rosenkranz SK. The effects of resistance training on myostatin and follistatin in adults: A systematic review and meta-analysis. Physiol Behav. 2023 Oct 1;269:114272. doi: 10.1016/j.physbeh.2023.114272. Epub 2023 Jun 14. PMID: 37328021.

Myostatin inhibitors notoriously failed to reach efficacy in humans. Although they had significant effects on muscle mass of mice, creating ‘mighty mice’, they have essentially been abandoned for further research in humans due to their lack of efficacy[58]. This indicates Myostatin does not play a huge role in human muscle. If you'd like to do further reading to understand the biological reasons they failed in clinical trials read; ‘The Failed Clinical Story of Myostatin Inhibitors against Duchenne Muscular Dystrophy: Exploring the Biology behind the Battle’.

56. MK-677 builds 90% water

This is an extremely common myth. It is undeniable that MK-677 will lead to significant water retention amongst recreational users, however many people online claim that almost all the size built is water retention and just ‘vanishes’ when you cycle off. This is not the case. A 1998 study titled ‘Two-month treatment of obese subjects with the oral growth hormone (GH) secretagogue MK-677 increases GH secretion, fat-free mass, and energy expenditure’[59], The study found that after eight weeks of treatment, subjects who received MK-677 experienced an increase in FFM of approximately 3 kg compared to the placebo group. This study considered water weight and suggested that methodological shortcomings of water weight measurements may account for roughly half of the observed increase in fat-free mass (FFM). This means it is likely the true value of muscle mass gained was 1.5 kg or greater. MK-677 has been shown to increase IGF-1 levels, through its agonism of the GHS-R1A receptor (Growth Hormone Secretagogue Receptor 1A),and IGF-1 modulates the PI3K/Akt pathway which plays a critical role in myotube hypertrophy[60]. Clearly it will build notable amounts of muscle.

---

[58] Rybalka, E.; Timpani, C.A.; Debruin, D.A.; Bagaric, R.M.; Campelj, D.G.; Hayes, A. The Failed Clinical Story of Myostatin Inhibitors against Duchenne Muscular Dystrophy: Exploring the Biology behind the Battle. Cells 2020, 9, 2657. https://doi.org/10.3390/cells9122657

[59] Svensson J, Lönn L, Jansson JO, Murphy G, Wyss D, Krupa D, Cerchio K, Polvino W, Gertz B, Boseaus I, Sjöström L, Bengtsson BA. Two-month treatment of obese subjects with the oral growth hormone (GH) secretagogue MK-677 increases GH secretion, fat-free mass, and energy expenditure. J Clin Endocrinol Metab. 1998 Feb;83(2):362-9. doi: 10.1210/jcem.83.2.4539. PMID: 9467542.

[60] Rommel C, Bodine SC, Clarke BA, Rossman R, Nunez L, Stitt TN, Yancopoulos GD, Glass DJ. Mediation of IGF-1-induced skeletal myotube hypertrophy by PI(3)K/Akt/mTOR and PI(3)K/Akt/GSK3 pathways. Nat Cell Biol. 2001 Nov;3(11):1009-13. doi: 10.1038/ncb1101-1009. PMID: 11715022.

Additionally a study titled ‘MK-677, an Orally Active Growth Hormone Secretagogue, Reverses Diet-Induced Catabolism’ [61], showed clear improvements in nitrogen retention amongst those taking MK-677, (+0.31 g/day) compared to those taking a placebo, who remained in a negative nitrogen balance (-1.48 g/day). This suggests that MK-677 helped prevent muscle breakdown and supported muscle maintenance or growth under calorie-restricted conditions.

57. Steroids actions are limited to the androgen receptor

The specific receptors relevant to anabolic-androgenic steroids are conveniently called the steroid receptors, which consist of; the estrogen receptor, the androgen receptor (which is the most well studied and relevant to the topic of anabolic steroids), progesterone receptors, estrogen receptors, and mineralocorticoid receptors. All these receptors are relevant to how muscle is built. For reference, these receptors are called the ‘steroid hormone receptor family’.
Starting with the most potent, the androgen receptors.
Anabolic steroids bind to the androgen receptors, forming a receptor complex, which then is transported to the cells nucleus, where it will activate the transcription (changes) of specific genes which will cause muscular growth (increase in the synthesis of two contractile proteins actin and myosin). This process can be visualized in the diagram above. Out of all the receptors, synthetic steroids and natural androgens like Testosterone and DHT structural similarities too, meaning they are more likely to bind to these receptors. This is known as ‘affinity’.
Next, the glucocorticoid receptors.
The primary glucocorticoid that binds to this receptor is cortisol (the ‘stress hormone’), and glucocorticoids/cortisol as you can imagine signal to the cell to release protein (catabolism - breakdown of muscle tissue). This is thought to happen to increase the amount of energy available during a stressful period of time. Testosterone has a high affinity to this glucocorticoid

[61] Murphy MG, Plunkett LM, Gertz BJ, He W, Wittreich J, Polvino WM, Clemmons DR. MK-677, an orally active growth hormone secretagogue, reverses diet-induced catabolism. J Clin Endocrinol Metab. 1998 Feb;83(2):320-5. doi: 10.1210/jcem.83.2.4551. PMID: 9467534.

receptors, so when you administer high doses of testosterone or synthetic steroids, they are more able to outcompete glucocorticoids in the binding to these receptors and thus decrease the likelihood and amount of muscle catabolism. This is known as the anti-glucocorticoid effect of testosterone. As you can imagine, the higher affinity an anabolic steroid has for the glucocorticoid receptor, the more muscle-sparing the anabolic steroid, meaning it conserves the muscle even during a caloric deficit.

Next, the mineralocorticoid receptors.

The agonism (activation) or antagonism (doesn't have an effect and serves to block the receptor) of mineralocorticoid receptors leads to changes in sodium reabsorption, water retention and more and plays an important role in hypertension. Anabolic steroids agonise the mineralocorticoid receptor leading to changes in water retention and blood pressure in users. Specific steroids have greater affinities for the mineralocorticoid receptor.

Next, the progesterone receptors.

Many hormones can bind to the progesterone receptor, with progesterone obviously having the highest affinity for it. Anabolic steroids with progestogenic activity, or an affinity to the progesterone receptor, have side effects such as gynecomastia growth and the negative feedback inhibition of testosterone. As a result this may be why anabolic steroids such as Nandrolone, Trenbolone, and Testolone (MENT) which have progestogenic activity are the most suppressive hormones and can shut down Testosterone production for the longest.

Many people in bodybuilding circles don't realise that progesterone receptor agonism leads to the upregulation of estrogen receptors, making the body more sensitive to estrogenic activity, and by the way steroids can also bind to these estrogen receptors too. As you can see there is a very complex interplay that goes far beyond the androgen receptor.

Lastly, the estrogen receptors.

These receptors regulate gene expression and play important roles in reproductive tissues, joints, bones, and the cardiovascular system. It's common knowledge that estrogenic steroids are the best mass builders, and this is partly due to aromatisation but also due to affinity to estrogen receptors. Estrogen receptor activation helps regulate glucose utilization in muscle cells which is very important for promoting an anabolic state.

As you can see there are many different effects of AAS’ and depending on the context of usage each effect could be considered an advantage or disadvantage.

58. Finasteride will stunt muscle growth

Finasteride inhibits the enzyme 5 alpha reductase from converting Testosterone into DHT. DHT is more potent than Testosterone, so on paper it appears blocking this conversion, via Finasteride, would have negative consequences on muscle mass. However this is not the case. A study titled 'Effect of Testosterone Supplementation With and Without a Dual 5α-Reductase Inhibitor on Fat-Free Mass in Men With Suppressed Testosterone Production A Randomized Controlled Trial' investigated Dutasteride (a even more potent 5 alpha reductase inhibitor) effect on muscle growth[62]. "Eight treatment groups received 50, 125, 300, or 600 mg/wk of testosterone enanthate for 20 weeks plus placebo (4 groups) or 2.5 mg/d of dutasteride (4 groups)" and at the end of the trial researchers concluded "Changes in fat-free mass in response to graded testosterone doses did not differ in men in whom DHT was suppressed by dutasteride from those treated with placebo". If Dutasteride, a more potent 5AR inhibitor, doesnt affect muscle mass, then clearly Finasteride will have 0 effect on muscle mass.
So why does it have no effect? Because the enzyme 5 alpha reductase is only found in trace amounts in skeletal muscle tissue - only 0.28% of Testosterone was converted into DHT in muscle tissue in this study[63].
This study did not consider the recently discovered type 3 5 Alpha Reductase isoenzyme, which is expressed in muscle tissue, but Finasteride is only a partial inhibitor of the type 3 isoenzyme and primarily inhibits the type 2 isoenzyme. Its possible DHT plays a role in muscle tissue (probably strength related) but since the type 2 isoenzyme is barely found in muscle tissue it is unlikely Finasteride will have any effect on muscle function, and doesn't have any effect on

---

[62] Bhasin S, Travison TG, Storer TW, Lakshman K, Kaushik M, Mazer NA, Ngyuen AH, Davda MN, Jara H, Aakil A, Anderson S, Knapp PE, Hanka S, Mohammed N, Daou P, Miciek R, Ulloor J, Zhang A, Brooks B, Orwoll K, Hede-Brierley L, Eder R, Elmi A, Bhasin G, Collins L, Singh R, Basaria S. Effect of testosterone supplementation with and without a dual 5α-reductase inhibitor on fat-free mass in men with suppressed testosterone production: a randomized controlled trial. JAMA. 2012 Mar 7;307(9):931-9. doi: 10.1001/jama.2012.227. PMID: 22396515; PMCID: PMC6035750.
[63] Longcope C, Fineberg SE. Production and metabolism of dihydrotestosterone in peripheral tissues. J Steroid Biochem. 1985 Oct;23(4):415-9. doi: 10.1016/0022-4731(85)90187-6. PMID: 4068703.

muscle size. There are also two smaller studies that show Finasteride/Dutasteride have negligible effect on muscle tissue [64] [65].

59. SARMS are more Hepatotoxic (liver toxic) than steroids

The evidence that SARMS are significantly Hepatotoxic are limited. The 3 most used SARMS are LGD-4033, Ostarine, and RAD-140.
A phase 1 trial on LGD-4033 titled 'The Safety, Pharmacokinetics, and Effects of LGD-4033, a Novel Nonsteroidal Oral, Selective Androgen Receptor Modulator, in Healthy Young Men' [66], reported no statistically significant changes in the two main liver health biomarkers aspartate aminotransferase (AST) and alanine aminotransferase (ALT). The only evidence LGD-4033 is Hepatotoxic comes from a few case reports. However a big issue is that case reports are retrospective, and the patients say they took LGD-4033, but there's no regulation ensuring the quality of SARMs products, and no way for researchers to know whether it was LGD-4033 or an oral steroid which has been shown to be Hepatotoxic. Ostarine (Enobosarm, MK-2866, or GTx-024) seems to be the most hepatotxic SARM, however in one of its studies titled 'The selective androgen receptor modulator GTx-024 (enobosarm) improves lean body mass and physical function in healthy elderly men and postmenopausal women: results of a double-blind,

---

[64] Page ST, Amory JK, Bowman FD, Anawalt BD, Matsumoto AM, Bremner WJ, Tenover JL. Exogenous testosterone (T) alone or with finasteride increases physical performance, grip strength, and lean body mass in older men with low serum T. J Clin Endocrinol Metab. 2005 Mar;90(3):1502-10. doi: 10.1210/jc.2004-1933. Epub 2004 Nov 30. PMID: 15572415.
[65] Gava G, Armillotta F, Pillastrini P, Giagio S, Alvisi S, Mancini I, Morselli PG, Seracchioli R, Meriggiola MC. A Randomized Double-Blind Placebo-Controlled Pilot Trial on the Effects of Testosterone Undecanoate Plus Dutasteride or Placebo on Muscle Strength, Body Composition, and Metabolic Profile in Transmen. J Sex Med. 2021 Mar;18(3):646-655. doi: 10.1016/j.jsxm.2020.12.015. Epub 2021 Jan 30. PMID: 33531255.
[66] Basaria S, Collins L, Dillon EL, Orwoll K, Storer TW, Miciek R, Ulloor J, Zhang A, Eder R, Zientek H, Gordon G, Kazmi S, Sheffield-Moore M, Bhasin S. The safety, pharmacokinetics, and effects of LGD-4033, a novel nonsteroidal oral, selective androgen receptor modulator, in healthy young men. J Gerontol A Biol Sci Med Sci. 2013 Jan;68(1):87-95. doi: 10.1093/gerona/gls078. Epub 2012 Mar 28. PMID: 22459616; PMCID: PMC4111291.

placebo-controlled phase II trial', for 8 patients who had elevated ALT and AST levels, 7 of them returned to normal whilst still continuing Ostarine administration[67].

For RAD-140, a study titled 'A First-in-Human Phase 1 Study of a Novel Selective Androgen Receptor Modulator (SARM), RAD140, in ER+/HER2- Metastatic Breast Cancer' reported a 59.1% increase in Aspartate Aminotransferase (AST) and 45.5% increase in Alanine Aminotransferase (ALT)[68]. However the exclusion criteria was only 28 days after chemotherapy. Some chemotherapies can cause prolonged elevation of AST and ALT. It's unclear whether this would have affected the studies data but is something worth considering when thinking about RAD-140.

As mentioned before there are multiple case reports above liver damage from SARMs, however the main limitation is that they are retrospective, and the patients say they took SARMs, but there's no regulation ensuring the quality of SARMs products, and they could have been taking literally anything. Case reports are also low quality evidence and rank at the bottom of the scientific hierarchy of evidence right next to anecdotes.

Clearly the evidence about SARMs Hepatotoxicity is limited, if not non-existent. There is no comparison, in terms of hepatotoxicity to anabolic-androgenic steroids, particularly oral AAS', but also injectables too (as mentioned in myth 52).

---

[67] Dalton JT, Barnette KG, Bohl CE, Hancock ML, Rodriguez D, Dodson ST, Morton RA, Steiner MS. The selective androgen receptor modulator GTx-024 (enobosarm) improves lean body mass and physical function in healthy elderly men and postmenopausal women: results of a double-blind, placebo-controlled phase II trial. J Cachexia Sarcopenia Muscle. 2011 Sep;2(3):153-161. doi: 10.1007/s13539-011-0034-6. Epub 2011 Aug 2. PMID: 22031847; PMCID: PMC3177038.

[68] LoRusso P, Hamilton E, Ma C, Vidula N, Bagley RG, Troy S, Annett M, Yu Z, Conlan MG, Weise A. A First-in-Human Phase 1 Study of a Novel Selective Androgen Receptor Modulator (SARM), RAD140, in ER+/HER2- Metastatic Breast Cancer. Clin Breast Cancer. 2022 Jan;22(1):67-77. doi: 10.1016/j.clbc.2021.08.003. Epub 2021 Aug 20. PMID: 34565686.

60. If a steroid is a substrate for 5 alpha reductase it isn't 'hair-safe'

This is not necessarily the case at all. For example, Nandrolone 5 alpha reduces into a less androgenic molecule, 5α-Dihydronandrolone, in tissues with 5 alpha reductase enzyme activity, therefore having less androgenic activity in the scalp due to its affinity with 5 alpha reductase. If you use Finasteride with Nandrolone you'll experience more hair loss than without it.
The important qualities of steroids that affect how 'hair-safe' are as follows; their interaction with 5 alpha reductase and aromatase, the potency of the molecule and its metabolites, its half-life, its dosage, the affinity of the molecule and its metabolites to the androgen receptor, and the use of Finasteride.

61. If you overtrain you're risking Rhabdomyolysis

Rhabdomyolysis incidence is notoriously hard to measure properly, however approximately 26,000 Americans will experience it each year[69], and as a measure of population thats ~ 1 in 12884 people. It's clearly a extremely rare condition, with 80% of cases being due to congenital diseases, and infection[70].
Overtraining leading to Rhabdomyolysis is clearly an extremely rare phenomenon and is largely overstated. The longer and more intensely you train, paired with limited caloric intake and poor sleep, the more likely you are to experience this condition. Those who work a physically demanding job, as well as resistance training, are likely more at risk.

---

[69] Graves EJ, Gillum BS. Detailed diagnoses and procedures, National Hospital Discharge Survey, 1995. Vital Health Stat 13. 1997 Nov;(130):1-146. PMID: 9429338.
[70] Elsayed EF, Reilly RF. Rhabdomyolysis: a review, with emphasis on the pediatric population. Pediatr Nephrol. 2010 Jan;25(1):7-18. doi: 10.1007/s00467-009-1223-9. PMID: 19529963.

62. *If your biomarkers are within normal ranges on cycle, your health isn't suffering*

Biomarkers are very good indicators of health and getting the greatest variety of biomarkers is key to identifying areas affected by AAS, which is key for treatment. However there are some aspects of health not easily measured. One area that concerns me particularly is its cognitive effects. Anabolic steroids such as Nandrolone and Trenbolone have been directly linked to cognitive

63. *Peptides are side effect free*

Amongst bodybuilding circles many peptides and their side effects are viewed as an afterthought but some can have side effects comparable to compounds viewed to be stronger. There are groups of people in peptide-treatment communities that report BPC-157 induced crippling anxiety, and cite its ability to alter regional serotonin synthesis[71]. There are many more examples of severe reported side effects from peptides reported in anecdotes. Peptides in general are very poorly studied and there is limited scientific evidence that can substantiate or disprove side effect claims made about many peptides, so recreational users should maintain caution.

64. *You need muscle sparring steroids on a cut to maintain muscle mass*

If you are a natural who wants to maintain muscle mass while on a cut, you don't need to introduce AAS with muscle sparring abilities. You can maintain a very high proportion of your

[71] Tohyama Y, Sikirić P, Diksic M. Effects of pentadecapeptide BPC157 on regional serotonin synthesis in the rat brain: alpha-methyl-L-tryptophan autoradiographic measurements. Life Sci. 2004 Dec 3;76(3):345-57. doi: 10.1016/j.lfs.2004.08.010. PMID: 15531385.

muscle mass if; 1) you cut over an extended period allowing you to be in less severe deficit, 2) you increase the volume of training (resistance training helps prevent muscle catabolism so increasing frequency will diminish muscle catabolism), 3) decrease intensity to prevent injuries which ultimately are the biggest cause the most muscle catabolism amongst bodybuilders, 4) increasing protein intake to allow for you to maintain a positive protein balance, meaning muscle protein synthesis exceeds muscle protein breakdown[72].

65. SARMS are 'hair safe'

The main reason why SARMs have been theorised to be hairsafe, and maybe even beneficial is for two theorised reasons: 1) when SARM with high binding affinity enters the body, it competes with testosterone and DHT for androgen receptors, thus reducing androgenic activity at the hair follicle reducing androgenic alopecia progression, and 2) SARMs suppress the body's natural production of testosterone by lowering LH and FSH, downstream lowering DHT levels, reducing androgenic alopecia progression too.
However there are some problems with this. Even though SARMS are more selective for muscle tissue, they still have inherent androgenic activity and their agonist of androgen receptors in hair follicles, will cause androgenic alopecia. Although there were some promising SARMs investigated for hair loss, they are not commonly used.
The most overlooked factor is SARMs effect on SHBG. DHT has a 5x higher affinity for SHBG than Testosterone, so it's likely a lot of DHT in your body is bound, and SARMs crush SHBG, causing a dump of DHT which will obviously cause a lot of hair loss. LGD-4033 and RAD-140 crushes SHBG most significantly and are notorious for hair loss. Almost all users report some acceleration of hair loss from SARMs.

66. SARMs are not potent muscle builders

[72] Carbone JW, Pasiakos SM. Dietary Protein and Muscle Mass: Translating Science to Application and Health Benefit. Nutrients. 2019 May 22;11(5):1136. doi: 10.3390/nu11051136. PMID: 31121843; PMCID: PMC6566799.

This is a myth that has been very widely spread amongst bodybuilding circles. When SARMs were initially being researchers and first recreationally used there was lots of hype about your potential. This was only exacerbated by SARM suppliers and affiliates trying to profit over people's excitement. As a result there's been a lot of pushback, with people claiming they barely have any effect, or 'they have all the side effects of steroids with none of the benefits'. But technically, milligram for milligram SARMs are more effective than AAS. For instance, LGD-4033 was investigated no higher than 2mg aside from its first safety profile phase 1 trial, yet produced significant improvements in lean body mass. In a study titled 'VK5211, a Novel Selective Androgen Receptor Modulator (SARM), Significantly Improves Lean Body Mass in Hip Fracture Patients: Results of a 12 Week Phase 2 Trial' [73]LGD-4033 (VK5211 was its developmental code) lead to placebo-adjusted increases in lean body mass - 4.8% at 0.5mg, 7.2% at 1.0mg, and 9.1% at 2.0mg. 81% of patients who took 2.0mg saw a 2.0kg increase in lean body mass. This took place over 12 weeks. In a study titled 'Comparing the Impacts of Testosterone and Exercise on Lean Body Mass, Strength and Aerobic Fitness in Aging Men' 100mg of transdermal testosterone was applied daily and led to mean LBM increase of 0.5kg (0.9kg placebo-controlled). 81% of those taking 2 mg of LGD-4033 gained 2 kg or more of lean body mass (LBM), suggesting a higher mean. *So LGD-4033 delivered over twice the LBM increase of TRT at just 1/100th of the dose within the same time frame*.
Clearly milligram for milligram LGD-4033 is far more potent than Testosterone. However as you'd expect so are side effects. 1mg of LGD-4033 was shown to lower total Testosterone levels by 300 mg/dl [74].

---

[73] VK5211, a Novel Selective Androgen Receptor Modulator (SARM), Significantly Improves Lean Body Mass in Hip Fracture Patients: Results of a 12 Week Phase 2 Trial Branko Ristic*1 , Vladimir Harhaji2 , Paul Dan Sirbu3 , Moises Irizarry-Roman4 , Gabor Bucs5 , Istvan Sztanyi5 , Neil Binkley6 , Denise Orwig7 , Joel Neutel8 , Ken Homer8 , Marianne Mancini9 , Hiroko Masamune9 , Geoff Barker9 , Brian Lian https://onlinelibrary.wiley.com/doi/pdf/10.1002/jbmr.3621#page=38

[74] Basaria S, Collins L, Dillon EL, Orwoll K, Storer TW, Miciek R, Ulloor J, Zhang A, Eder R, Zientek H, Gordon G, Kazmi S, Sheffield-Moore M, Bhasin S. The safety, pharmacokinetics, and effects of LGD-4033, a novel nonsteroidal oral, selective androgen receptor modulator, in healthy young men. J Gerontol A Biol Sci Med Sci. 2013 Jan;68(1):87-95. doi: 10.1093/gerona/gls078. Epub 2012 Mar 28. PMID: 22459616; PMCID: PMC4111291.

Obviously at higher doses steroids are going to be far more effective, and the anecdotes very clearly confirm this, however taken at these study dosages LGD-4033 seems to be an extremely potent anabolic agent.
Keep in mind, only LGD-4033 and Testosterone was only mentioned so it's not a true ‘apples to apples’ comparison but the point still stands.

67. ‘Third party tested’ means the research chemical is high quality

It is commonplace for many research chemical and SARM vendors to advertise their products as third party tested. However is this really the case? These results can easily be faked. The FDA released a report in 2024 which mentioned “The FDA has identified an increase in submissions containing unreliable data generated by third-party test labs, including from numerous such facilities based in China and India” [75]. Essentially the best case you can expect from most RC/SARM vendors is that they find a chemical supplier from Alibaba, resell the compounds at 5x the price with their branding, and provide third party tested results, but most commonly they sell fake products with fake third party tested results.

68. BPC-157 + TB-500 is the wolverine stack

A study in 2014, titled ‘Pentadecapeptide BPC 157 Enhances the Growth Hormone Receptor Expression in Tendon Fibroblasts’[76], attempted to elucidate the mechanism by which BPC 157 works to improve healing of the tendon. In a previous study researchers performed a cDNA microarray (one of the best tools for analyzing gene expression) on tendons treated by BPC-157 to see which genes were up-regulated by its administration. They noticed the upregulation of the growth hormone receptor.

---

[75]https://www.fda.gov/medical-devices/industry-medical-devices/fraudulent-and-unreliable-laboratory-testing-data-premarket-submissions-fda-reminds-medical-device
[76] Chang CH, Tsai WC, Hsu YH, Pang JH. Pentadecapeptide BPC 157 enhances the growth hormone receptor expression in tendon fibroblasts. Molecules. 2014 Nov 19;19(11):19066-77. doi: 10.3390/molecules191119066. PMID: 25415472; PMCID: PMC6271067.

They furthered this line of investigation by treating tendon fibroblasts with varying BPC-157 concentrations (0, 0.1, 0.25 and 0.5 µg/mL) for 24h. It was found the level of BPC-157 led to a dose-dependent increase in growth hormone receptor upregulation.

Another notable thing is at a concentration of 0.5 µg/mL, BPC-157 significantly increased growth hormone receptor expression in tendon fibroblasts over time, from day one to three, with sevenfold increases at day 3.

Another interesting line of inquiry in this study was that researchers treated the tendon fibroblasts with both BPC-157 and growth hormone to see if it would further enhance its healing effects through synergy. They found the number of total viable cells in the tendons correlated well with the amount of GH/BPC-157 used. Notably the most dramatic increase was seen in day 3 of tendons treated with both BPC-157 and GH.

Simply put, the combined administration led to a synergistic effect, dramatically increasing viable tendon cells on day three compared to either treatment alone.

This synergy highlights the potential for BPC-157 to act as a catalyst for GH’s reparative properties, opening the door to more effective therapeutic strategies for tendon and soft tissue injuries.

69. The infamous 'myostatin gene'

It is a common myth that all the top bodybuilders share a gene that codes for myostatin deficiency. This is no more than hype. The myostatin gene (MSTN) codes for the production of the myostatin protein, which regulates skeletal muscle growth by restraining it. Myostatin prevents the body from gaining too much muscle. As mentioned before myostatin plays a much larger role in the body of mice and cattle and Myostatin inhibitors notoriously failed to reach efficacy in humans, suggesting myostatin gene mutations are not a significant factor in muscle growth in humans, even in elite bodybuilders.
A study on the impact of MSTN gene mutations on bodybuilding progress (study included five Mr. Olympia contenders and several other top-tier IFBB pros) found that there was no significant relationship between these mutations and overall muscle mass response to strength training[77]. Three individuals in the study, including Flex Wheeler, had extremely rare nucleotide changes. However, the study concluded that these mutations did not significantly affect muscle growth response to training.

70. MK-677 helps hair loss

MK-677 works by agonising the GHS-R1A causing the secretion of GH and subsequent increase of IGF-1 via the GH/IGF-1 axis. An 2021 article called 'Growth Hormone and the Human Hair Follicle' explored this relationship in great depth[78].
They conclude that excess GH clinically causes greater hair growth in men, whereas in females certain effects of GH may outweigh this benefit. The mechanism by which it promotes greater hair growth in men is through IGF-1 which generally promotes a more potent anagen (growth

[77] Ferrell RE, Conte V, Lawrence EC, Roth SM, Hagberg JM, Hurley BF. Frequent sequence variation in the human myostatin (GDF8) gene as a marker for analysis of muscle-related phenotypes. Genomics. 1999 Dec 1;62(2):203-7. doi: 10.1006/geno.1999.5984. PMID: 10610713.
[78] Horesh EJ, Chéret J, Paus R. Growth Hormone and the Human Hair Follicle. Int J Mol Sci. 2021 Dec 8;22(24):13205. doi: 10.3390/ijms222413205. PMID: 34948002; PMCID: PMC8706217.

phase) prolonging factor in hair follicles. An increase of the anagen phase in hair follicles can help your hair look thicker.
Anecdotally, a lot of users report greater hair growth, and better hair density when on MK-677. While this is a positive, GH and IGF play no part in treating the root cause of androgenetic alopecia which is caused by DHT binding to scalp hair follicles and transcribing its effects leading to hair follicle miniaturization. Cosmetically MK-677 will make your hair look better and thicker not because it treats hair loss, but because unaffected hair follicles will have prolonged growth phases. This may be an important factor for those looking for a substance that 'boosts' performance enhancement without detrimental effects to hair follicles, which are commonplace for people running certain cycles and protocols of anabolic steroids, but for most this is just a fringe benefit they notice whilst on it. What is clear from the studies is GH treatment will have the greatest effect for those who are already GH deficient, but I'd speculate that the effects would be mild if you have a normal amount of GH and IGF-1.
If you are interested in treating hair loss check out articles here.

71. BPC-157 has no human studies and safety data

Many sources online when discussing Peptides from a negative light, mention the widespread use of BPC-157 despite a lack of human data. Without mentioned specific sites, many have statements such as 'the only human data on this peptide is a retrospective study on 12 patients with knee pain'. However this is not the case and clearly many have not done their research on this compound. Back in 2002 there was actually a phase 1 clinical trial on BPC-157 under its developmental name PL 14736 for Ulcerative Colitis a chronic inflammatory bowel disease (which affects the inner lining of the colon in the large intestine) and was safe and well tolerated[79].

[79] Veljača, M., Pavić-Sladoljev, D., Mildner, B., Brajša, K., Krnić, Ž., Bubenik, M., Stipaničić, S., Tabak-Slošić, M., Brnić, L., Khan, Z., Krznarić, Ž., Bischoff, A., Scroeder, A., Dongen, W.V., & Schaik, F.V. (2002). Safety, tolerability and pharmacokinetics of PL 14736, a novel agent for treatment of ulcerative colitis, in healthy male volunteers.

72. *'Bubble gut' is caused by primarily Growth Hormone ('GH gut')*

The bubble gut (Abdominal Hypertrophy Syndrome) phenomenon in bodybuilding is commonly associated with Insulin and Growth Hormone, as both appeared during 90s bodybuilding. It is particularly associated with Growth Hormone, because of its colloquial name 'Palumboism' which refers to Dave Palumbo who has this condition. However is GH the primary cuprite? Likely not.
Bodybuilders often consume over 750g or more of carbohydrates daily to support muscle growth. Constantly high carbohydrate intake overburdens the pancreas, increasing insulin production. Over time this will result in insulin resistance, a state where cells become less responsive to insulin, leaving blood sugar levels elevated. Chronically high blood sugar can impair the intestines' ability to contract efficiently (intestinal transit), slowing digestion and leading to bloating and abdominal distention. Intestinal bloating may also be caused by an increase of bacteria in the small intestine, also caused by overconsumption of carbohydrates. GH can also lead to insulin resistance. The combination of the two exacerbates this condition.

Visceral fat deposited around internal organs seems to also be a contributing factor. Continuous fructose consumption is a metabolic burden on the liver and can lead to visceral fat accumulation around the liver leading to NAFLD (Non-alcoholic fatty liver disease)[80].
Clearly GH is not the sole contributing factor to Abdominal Hypertrophy Syndrome, nor the primary culprit, as this condition is almost exclusively seen in bodybuilders and is relatively unreported amongst Acromegalics (people with acromegaly - overproduction of natural GH).

[80] Chong MF, Fielding BA, Frayn KN. Metabolic interaction of dietary sugars and plasma lipids with a focus on mechanisms and de novo lipogenesis. Proc Nutr Soc. 2007 Feb;66(1):52-9. doi: 10.1017/S0029665107005290. PMID: 17343772.

73. MK-677 causes brain damage

This myth stems from a rodent study titled ‘A ghrelin-growth hormone axis drives stress-induced vulnerability to enhanced fear’.
The study involved injecting rats with MK-677 and then inducing fear, and found that rats chronically exposed to ghrelin had enhanced fear memory. So then researchers later infused MK-677 directly into the rats' brains and found repeated infusions enhanced fear memory. However, a single injection of MK-677 did not enhance fear, nor did chronic ghrelin receptor agonism alter movement, or the expression of previous fear memories, or anxiety. MK-677 has been studied in over 1300 patients and is still undergoing clinical development under the name LUM-201, and none of these symptoms have been reported in any clinical trials.
MK-677 acting as a ghrelin mimetic will lead to an increase of GH/IGF-1 in the body, which is actually neuroprotective for the brain. MK-677 may in fact prevent brain damage due GH’s neuroprotective properties.
GH can activate neural stem cells (NSCs) in the adult brain[81]. This can lead to an increase in the number of neurons in key regions of the brain, particularly the hippocampus, which is critical for learning and memory. GH can induce BDNF expression, BDNF (brain-derived neurotrophic factor) is a protein that plays a role in learning and memory functions[82].

74. Only low Testosterone affects sex drive

One thing many in bodybuilding circles fail to consider is Estradiol (active form of Estrogen) plays a crucial role in male libido. A study titled ‘Gonadal steroids and body composition, strength, and sexual function in men’ administered Testosterone with and without aromatase inhibitors (inhibit enzyme aromatase which is necessary for estradiol production) and found impaired sexual function when aromatisation was blocked, indicating estradiol is necessary for

[81] Blackmore DG, Waters MJ. The multiple roles of GH in neural ageing and injury. Front Neurosci. 2023 Mar 7;17:1082449. doi: 10.3389/fnins.2023.1082449. PMID: 36960169; PMCID: PMC10027725.
[82] IBID

male libido[83]. Estrogen receptors and aromatase are abundant in the brain, penis and other organs involved in men's sexual function, indicating they play an important role. On the other hand high estrogen levels also leads to decreased libido[84].

75. x steroid builds more muscle than x steroid

All steroids essentially build the same amount of muscle. Nitrogen retention is an accepted measure of protein anabolism. In a study titled ‘A quantitative expression for nitrogen retention with anabolic steroids: IV. Oxandrolone’ [85]researchers investigated the nitrogen retention values of Oxandrolone (Anavar) and compared it to 4 other AAS’. They found “The retention ratio for this compound was independent of the usual denominators of nitrogen sparing and almost identical in value to those previously reported for 4 other anabolic steroids. The almost exact agreement in the retention ratio of these 5 compounds suggests that the retention ratio may be a constant”. This was reconfirmed in a study titled ‘Metabolic effects of anabolic steroids’ [86].

---

[83] Finkelstein JS, Yu EW, Burnett-Bowie SA. Gonadal steroids and body composition, strength, and sexual function in men. N Engl J Med. 2013 Dec 19;369(25):2457. doi: 10.1056/NEJMc1313169. PMID: 24350954.
[84] Schulster M, Bernie AM, Ramasamy R. The role of estradiol in male reproductive function. Asian J Androl. 2016 May-Jun;18(3):435-40. doi: 10.4103/1008-682X.173932. PMID: 26908066; PMCID: PMC4854098.
[85] METCALF W, BLUMBERG H, ROACH J. A QUANTITATIVE EXPRESSION FOR NITROGEN RETENTION WITH ANABOLIC STEROIDS. IV. OXANDROLONE. Metabolism. 1965 Jan;14:59-66. doi: 10.1016/0026-0495(65)90081-8. PMID: 14252343.
[86] van Wayjen RG. Metabolic effects of anabolic steroids. Wien Med Wochenschr. 1993;143(14-15):368-75. PMID: 8256449.

76. RAD-140's half life

RAD-140 for whatever reason had a reported half life of 20-24 hours amongst recreational users despite it being reported to be between 45-60 hours in two studies after 2020[87] [88]. This was brought to light by youtubers More Plates More Dates and Ryan Russo.

77. Golden era guys only took 100mg of Dianabol and Primobolan trust me bro

In a Ric Drasin 2012 interview, Steve Davis claimed that the standard protocol was 3 Dianabol tablets a day and one Primobolan injection each week. This was achieved by Golds Gym having an affiliated doctor who essentially handed out prescriptions for these compounds.
In the interview Steve says "And we heard that certain Austrians were taking 4 Dianabol a day and a shot a week". Clearly many of the athletes were aware that increases in muscle mass were dose-dependent, and I'm sure many had at least some basic knowledge on these compounds based on existing studies. Thinking that these bodybuilders did not take more than this amount fails to consider how far 99% of professional athletes are willing to go to compete. Its the nature of competition for athletes to make sacrifices (in this case their health) in order to be the best.
Famously, Robert Goldman asked 198 elite athletes whether they'd take a magic drug that would help them become the best in the world at their sport but they could only live for 5 years after taking it, and 52% responded yes. It's seriously doubtful none of these bodybuilders experimented with higher doses then the standard protocol to see how their body would react.

---

[87] LoRusso P, Hamilton E, Ma C, Vidula N, Bagley RG, Troy S, Annett M, Yu Z, Conlan MG, Weise A. A First-in-Human Phase 1 Study of a Novel Selective Androgen Receptor Modulator (SARM), RAD140, in ER+/HER2- Metastatic Breast Cancer. Clin Breast Cancer. 2022 Jan;22(1):67-77. doi: 10.1016/j.clbc.2021.08.003. Epub 2021 Aug 20. PMID: 34565686.
[88] 343P - Phase I dose escalation study of a selective androgen receptor modulator RAD140 in estrogen receptor positive (ER+), HER2 negative (HER2-) breast cancer (BC) E. Hamilton 1 , N. Vidula 2 , C. Ma 3 , P. LoRusso 4 , R.G. Bagley 5 , Z. Yu 6 , M. Annett 7 , A. Weitzman 5 , M.G. Conlan 5 , A. Weise 8

The doses were just downplayed because at this time bodybuilding was in its infancy and it was crucial the sport maintained a positive image.

78. Anabolic Androgenic Steroids downregulate androgen receptors

There are three studies that show Anabolic-Androgenic Steroids actually upregulate androgen receptors [89] [90] [91]. The only evidence that suggests AAS downregulate androgen receptors comes from a study titled 'Testosterone down-regulates the levels of androgen receptor mRNA in smooth muscle cells from the rat corpora cavernosa via aromatization to estrogens' [92]. However this rodent study doesn't even use AAS and instead uses Finasteride to raise Testosterone levels. AR downregulation is a common anecdote among steroid users, but the scientific literature doesn't support this notion.

---

[89] M E Doumit, D R Cook, R A Merkel, Testosterone up-regulates androgen receptors and decreases differentiation of porcine myogenic satellite cells in vitro, Endocrinology, Volume 137, Issue 4, 1 April 1996, Pages 1385–1394, https://doi.org/10.1210/en.137.4.1385

[90] Howard EE, Margolis LM, Berryman CE, Lieberman HR, Karl JP, Young AJ, Montano MA, Evans WJ, Rodriguez NR, Johannsen NM, Gadde KM, Harris MN, Rood JC, Pasiakos SM. Testosterone supplementation upregulates androgen receptor expression and translational capacity during severe energy deficit. Am J Physiol Endocrinol Metab. 2020 Oct 1;319(4):E678-E688. doi: 10.1152/ajpendo.00157.2020. Epub 2020 Aug 10. PMID: 32776828; PMCID: PMC7750513.

[91] Sheffield-Moore M, Urban RJ, Wolf SE, Jiang J, Catlin DH, Herndon DN, Wolfe RR, Ferrando AA. Short-term oxandrolone administration stimulates net muscle protein synthesis in young men. J Clin Endocrinol Metab. 1999 Aug;84(8):2705-11. doi: 10.1210/jcem.84.8.5923. PMID: 10443664.

[92] Lin MC, Rajfer J, Swerdloff RS, González-Cadavid NF. Testosterone down-regulates the levels of androgen receptor mRNA in smooth muscle cells from the rat corpora cavernosa via aromatization to estrogens. J Steroid Biochem Mol Biol. 1993 May;45(5):333-43. doi: 10.1016/0960-0760(93)90002-e. PMID: 8499343.

79. Exogenous GH doesn't cause suppression of natural levels

A study titled 'Growth Hormone Inhibits Its Own Secretion by Acting on the Hypothalamus through Its Receptors on Neuropeptide Y Neurons in the Arcuate Nucleus and Somatostatin Neurons in the Periventricular Nucleus' [93]explains exactly how GH inhibits its own secretion in order to regulate levels (feedback inhibition), evidently through its title.
How significant is this suppression? The suppression seems to be less significant then that seen from exogenous Testosterone on natural production. A study titled 'Time course and mechanism of growth hormone's negative feedback effect on its own spontaneous release' [94] reported that a single rhGH (recombinant human growth hormone) in rats suppressed growth hormone secretion for 4-8 in rats, which for humans may be closer to 24 hours due to differences in biology. It's unclear how long term exogenous growth hormone effects natural production however it is likely suppression is less severe to that of exogenous Testosterone on natural Testosterone production .

80. Proviron is a fat burner

Proviron (Mesterolone), is rarely used for its anabolic properties, because it was shown to have an anabolic-to-androgenic ratio lower than that of Testosterone. Its usage is almost always in respect to its ability to 'enhance' other steroids. By binding to SHBG/albumin, Proviron increases the amount of free testosterone available. It is believed to be fat burner due to its mild anti-aromatase effect (binds to the aromatase thus preventing other steroids from converting into estrogen), which in turn minimizes water retention and estrogen-related bloating.

---

[93] Minami S, Kamegai J, Sugihara H, Suzuki N, Wakabayashi I. Growth hormone inhibits its own secretion by acting on the hypothalamus through its receptors on neuropeptide Y neurons in the arcuate nucleus and somatostatin neurons in the periventricular nucleus. Endocr J. 1998 Apr;45 Suppl:S19-26. doi: 10.1507/endocrj.45.suppl_s19. PMID: 9790225.
[94] Lanzi R, Tannenbaum GS. Time course and mechanism of growth hormone's negative feedback effect on its own spontaneous release. Endocrinology. 1992 Feb;130(2):780-8. doi: 10.1210/endo.130.2.1346379. PMID: 1346379.

This is commonly misinterpreted as a fat burning effect. However Proviron does not directly stimulate lipolysis.

81. x ester is ‘better’ than x ester

Esters don’t change the inherent properties of the parent steroid; they only control how quickly it’s released into the bloodstream. No esters make a steroid more powerful. At the end of the day, your muscle cells only recognize testosterone itself, not the ester attached to it.

82. The anabolic/androgenic ratio (sorta)

Anabolic/androgenic ratios were a preclinical measure of how well a compound promotes anabolic effects versus promoting secondary male sexual characteristics/androgenic activity (prostate growth, androgenic alopecia, body hair growth).
Anabolic/androgenic ratios are calculated based on the effects of a compound on the levator ani muscle of rats (a non-skeletal muscle analogous to the PCG muscle in humans) compared to its effects on the prostate or seminal vesicles. However, the "anabolic" value is a poor predictor of how well a steroid promotes muscle growth in athletes, and the "androgenic" value doesn’t accurately reflect the androgenic side effects it may cause. These measurements are limited and don’t directly translate to real-world outcomes in humans. The most famous critique of this ratio and the distinction of the terms anabolic and androgenic comes from David Handelsman, a distinguished Australian endocrinologist.

83. MK-677 lowers Testosterone indirectly

The theory of how this happens is that Ghrelin inhibits the transcription of the kisspeptin gene in the hypothalamus. Kisspeptin-GPR54 is crucial in stimulating the release of gonadotropin-releasing hormone (GnRH)[95]. GnRH, in turn, signals the pituitary gland to release luteinizing hormone (LH) and follicle-stimulating hormone (FSH), both of which are essential for testosterone production. As a result Ghrein has been shown to significantly inhibit GnRH in rats[96]. This results in a decrease in LH pulse intensity and a delay in these pulses, ultimately affecting testosterone production.
However this theory fails to consider MK-677 human trials that show there to be a negligible effect on Testosterone production. According to a 1999 study titled 'Discrepancy between serum leptin values and total body fat in response to the oral growth hormone secretagogue MK-677', [97]MK-677 did not affect free testosterone levels or FSH and LH or Total Testosterone:SHBG ratio (a measure of free testosterone).

84. Growth hormone will cause a bloated, watery, soft physique

It is well known that the GH is a less potent anabolic agent then AAS. GH usage has also been associated with gut distention, acromegalic features, and water retention. As a result it has gotten a reputation as a weak physique enhancer. While its true the IGF-1 increase for GH doesn't typically lead to the dramatic increases seen with the use of AAS, its poor perception

---

[95] Skorupskaite K, George JT, Anderson RA. The kisspeptin-GnRH pathway in human reproductive health and disease. Hum Reprod Update. 2014 Jul-Aug;20(4):485-500. doi: 10.1093/humupd/dmu009. Epub 2014 Mar 9. PMID: 24615662; PMCID: PMC4063702.
[96] Fernández-Fernández R, Tena-Sempere M, Navarro VM, Barreiro ML, Castellano JM, Aguilar E, Pinilla L. Effects of ghrelin upon gonadotropin-releasing hormone and gonadotropin secretion in adult female rats: in vivo and in vitro studies. Neuroendocrinology. 2005;82(5-6):245-55. doi: 10.1159/000092753. Epub 2006 Apr 20. PMID: 16721030.
[97] Svensson J, Carlsson B, Carlsson LM, Jansson JO, Bengtsson BA. Discrepancy between serum leptin values and total body fat in response to the oral growth hormone secretagogue MK-677. Clin Endocrinol (Oxf). 1999 Apr;50(4):451-6. doi: 10.1046/j.1365-2265.1999.00667.x. PMID: 10468903.

arises through its association with levels taken in abuse territory. However, when GH isn't abused, these side effects are significantly minimized. The bloated look often attributed to GH is not an inherent feature of the hormone itself but rather a result of misuse - excessive dosage, failure to manage related factors like diet, insulin, or water retention effectively. GH's ability to promote lipolytic activity[98] as well as maintaining[99] or growth of muscle tissue is understated.

85. Combining diuretics is pointless

Diuretics are compounds that promote diuresis, the increased production of urine, and thus the excretion of water through the kidneys. Diuretics are incredibly dangerous when used improperly. They are often used before Bodybuilding shows to create a dry/hard look associated with depleted fluid, but are an unnecessary burden on your system unless you have an aspiration to compete. However, Diuretic combination is a well regarded practice in clinical circles[100] [101]. Combining a potassium-sparing diuretic like spironolactone with a thiazide or loop diuretic like furosemide helps balance potassium levels[102]. Thiazides and loop diuretics can lead to significant potassium loss, but spironolactone counteracts this by retaining potassium, reducing the risk of imbalances.

---

[98] Carrel AL, Allen DB. Effects of growth hormone on adipose tissue. J Pediatr Endocrinol Metab. 2000 Sep;13 Suppl 2:1003-9. PMID: 11086655.
[99] Gamrin L, Essén P, Hultman E, McNurlan MA, Garlick PJ, Wernerman J. Protein-sparing effect in skeletal muscle of growth hormone treatment in critically ill patients. Ann Surg. 2000 Apr;231(4):577-86. doi: 10.1097/00000658-200004000-00018. PMID: 10749620; PMCID: PMC1421035.
[100] Gogikar A, Nanda A, Janga LSN, Sambe HG, Yasir M, Man RK, Mohammed L. Combination Diuretic Therapy With Thiazides: A Systematic Review on the Beneficial Approach to Overcome Refractory Fluid Overload in Heart Failure. Cureus. 2023 Sep 3;15(9):e44624. doi: 10.7759/cureus.44624. PMID: 37720125; PMCID: PMC10500380.
[101] Neutel JM, Black HR, Weber MA. Combination therapy with diuretics: an evolution of understanding. Am J Med. 1996 Sep 30;101(3A):61S-70S. doi: 10.1016/s0002-9343(96)00269-0. PMID: 8876476.
[102] Arumugham VB, Shahin MH. Therapeutic Uses of Diuretic Agents. [Updated 2023 May 29]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557838/

86. Steroids increase appetite (sorta)

It's well known that some steroids have an appetite increasing effect. Nandrolone is often used off-label to increase appetite, and Boldenone (Equipoise) is used in cattle to improve feeding. However many steroids actually decrease appetite significantly. Methasterone (Superdrol) is reported anecdotally as being very appetite suppressant. Whereas some like Trenbolone, Oxymetholone (Anavar) have mixed reports on appetite, why is this?

The answer isn't exactly clear, however it may have something to do with Estrogen. Estrogen is well known to play a role in modulating serotonin activity [103] [104]. Serotonin's influence on food intake is intricate, with effects varying depending on the specific brain regions and serotonin receptor subtypes involved [105]. Serotonin's influence on food intake is intricate, with effects varying depending on the specific brain regions and serotonin receptor subtypes involved. For instance agonism of the 5HT1A and 5HT7 (at low levels) receptor increases food intake in rats, whereas agonism of the 5HT1B (slightly), 5HT2C receptor leads to a decrease in food intake[106]. Depending on an individual's serotonergic signaling, and baseline estrogen levels, appetite might be increased or decreased based on an anabolic's ability to aromatise.

There are some limitations of extrapolating information about Serotonin from rodent studies: Mice with the serotonin transporter (SERT) gene knocked out have higher anxiety levels (which affect feeding behaviours). However, this effect depends on the strain of the mouse, and some strains exhibit higher anxiety, while others do not. It appears SERT's effect on anxiety is influenced by polygenic traits and the individual mouse's genetic background, as different strains of mice have different genetic makeups. This leads to variations in how they respond to changes in serotonin signaling. It is important to note that knocking out a gene in a rodent

[103] Hernández-Hernández OT, Martínez-Mota L, Herrera-Pérez JJ, Jiménez-Rubio G. Role of Estradiol in the Expression of Genes Involved in Serotonin Neurotransmission: Implications for Female Depression. Curr Neuropharmacol. 2019;17(5):459-471. doi: 10.2174/1570159X16666180628165107. PMID: 29956632; PMCID: PMC6520586.

[104] Amin Z, Canli T, Epperson CN. Effect of estrogen-serotonin interactions on mood and cognition. Behav Cogn Neurosci Rev. 2005 Mar;4(1):43-58. doi: 10.1177/1534582305277152. PMID: 15886402.

[105] van Galen KA, Ter Horst KW, Serlie MJ. Serotonin, food intake, and obesity. Obes Rev. 2021 Jul;22(7):e13210. doi: 10.1111/obr.13210. Epub 2021 Feb 9. PMID: 33559362; PMCID: PMC8243944.

[106] IBID

doesn't always reflect what would happen if serotonin levels were reduced in an adult human. Knocking out a gene in a rodent means the rodent develops with altered serotonin levels, not developing it during adulthood (likeable to depletion of Serotonin from AAS).

87. Prolactin-induced Gynecomastia

This myth likely stems from the fact that prolactin-related nipple changes can resemble early-stage gynecomastia. People with Gynecomastia rarely have elevated Prolactin [107]. Symptoms often attributed to prolactin, such as puffy, sensitive nipples with oily discharge, are more likely caused by the enlargement of Montgomery glands, which are sebaceous glands that lubricate the nipples.
The prolactin-related effects on the nipples are temporary and separate from true gynecomastia (permanent hyperplasia and fibrosis of breast tissue).

88. Boldenone won't cause anxiety

Original anecdotes about Boldenone (Equipoise) speculated it had some anxiogenic effect, but there was a lot of pushback saying this was likely due to crashed E2, because Boldenone is a weak substrate for Aromatase. However a recent study on Boldenone titled 'Inhibition of boldenone-induced aggression in rats by curcumin: Targeting TLR4/MyD88/TRAF-6/NF-κB pathway' [108], attempted to elucidate Boldenones effect on the brain, and to see if Curcumin could reverse these effects.
The results showed that boldenone elicited aggression in rats, which was already known to happen, but highlighted that this was accompanied by depleted serotonin, enhanced oxidative stress, and inflammation via the upregulation of TLR4/MyD88/TRAF-6/NF-κB pathway.

---

[107] Dickson G. Gynecomastia. Am Fam Physician. 2012 Apr 1;85(7):716-22. PMID: 22534349.
[108] El-Shamarka ME, Eliwa HA, Ahmed MAE. Inhibition of boldenone-induced aggression in rats by curcumin: Targeting TLR4/MyD88/TRAF-6/NF-κB pathway. J Biochem Mol Toxicol. 2022 Jan;36(1):e22936. doi: 10.1002/jbt.22936. Epub 2021 Oct 31. PMID: 34719837.

For those who don't know, the inflammatory reaction is likely the cause of the subsequent serotonin deficiency[109] which is widely associated with anxiety (although there are some nuances to this).

89. If you don't experience x effect when using x compound, then its counterfeit

Identifying counterfeit products is a very complex issue. Originally identifying if a product is counterfeit was easy as producers operated on a small scale and were sloppier. Counterfeit steroid production has evolved significantly over time. As the black market for steroids has grown increasingly lucrative, counterfeiters adapted and invested in superior equipment and new techniques, making it much more difficult to distinguish their products from genuine pharmaceuticals[110]. Often within bodybuilding communities users will make a statement like ‘youll know if it's counterfeit if you don't experience x effect’. This precedent ignores the deeply complex response people can have to compounds. As touched on many times, the side effects a person experiences depends on a large number of factors, particularly their existing hormone profile. It also fails to recognise the extent to which counterfeit suppliers will go to profit. If a common experience with a compound is to experience an increase in appetite, counterfeit suppliers may add trace amounts of GHRP’s in order to stimulate this effect so users don't recognise it as counterfeit. Counterfeit suppliers act solely for profit.

---

[109] Dawood S, Bano S, Badawy AA. Inflammation and serotonin deficiency in major depressive disorder: molecular docking of antidepressant and anti-inflammatory drugs to tryptophan and indoleamine 2,3-dioxygenases. Biosci Rep. 2022 May 27;42(5):BSR20220426. doi: 10.1042/BSR20220426. PMID: 35506370; PMCID: PMC9142829.

[110] ANABOLICS 11th Edition by William Llewellyn - ISBN 10: 0999062107 - ISBN 13: 9780999062104 - Molecular Nutrition - 2017

90. Steroids reduce injury risk

AAS usage are heavily associated with tendon injury. Many people assume because muscular recovery is enhanced by AAS, that you have a lower injury risk. This is not the case unless you continue training in an intelligent way when enhanced. So why do they increase injury risk? There are a few reasons for this.
The rapid growth of the muscles allows the muscles to experience significantly more load and become stronger in a period of time much faster than that of a natural. But tendons also experience this load. Tendons are also responsive to androgens, but become more rigid rather than flexible from AAS[111], and dont experience the same amount of growth relative to that of skeletal muscle. Many AAS users may be inspired to increase workout volume and load due to this increased strength, which although may be necessary for progress, may lead to tendon injuries when taken to an extremity. This is likely the reason why tendon ruptures are commonly reported in bodybuilders and AAS users[112].

91. Nandrolone for joint healing

Nandrolone is often mentioned in the context of usage for those with joint pain, however pain relief and healing are unfortunately two distinct treatments. An analogy would be Panadol, which helps mask the pain but provides no regenerative abilities. Nandrolone has been studied to

[111] Marqueti RC, Prestes J, Wang CC, Ramos OH, Perez SE, Nakagaki WR, Carvalho HF, Selistre-de-Araujo HS. Biomechanical responses of different rat tendons to nandrolone decanoate and load exercise. Scand J Med Sci Sports. 2011 Dec;21(6):e91-9. doi: 10.1111/j.1600-0838.2010.01162.x. Epub 2010 Jul 29. PMID: 20673248.
[112] Jones, I.A., Togashi, R., Hatch, G.F.R., III, Weber, A.E. and Vangsness, C.T., Jr. (2018), Anabolic steroids and tendons: A review of their mechanical, structural, and biologic effects. J. Orthop. Res., 36: 2830-2841. https://doi.org/10.1002/jor.24116

provide relief for joint pain in Hypogonadol men[113] however many studies have shown Nandrolone to have no healing effect and even a detrimental effect in some[114] [115].

92. Boldenone is 100% kidney toxic (sorta)

Boldenone is often referred to as extremely kidney toxic, and while the effect of AAS on kidney health is far too overlooked (see myth 54), Boldenone specifically does not appear to be particularly nephrotoxic (relative to other androgens) according to existing scientific literature. The most direct human data comes from a study titled 'Evaluation of anabolic steroid induced renal damage with sonography in bodybuilders' which compared the nephrotoxicity of Testosterone, Boldenone, and Nandrolone[116]. Researchers observed the boldenone group had the worst kidney changes - increased thickness of the renal parenchyma, as well as larger kidney volume. However there was lack of information on steroid brands and purities and it doesnt appear the quality of Boldenone was tested. There was also an absence of inflammatory marker checks. Although protein itself isn't nephrotoxic (see myth 45), high protein consumption with AAS may place extra stress on the kidneys, and in the Boldenone group protein consumption was significantly higher. It may be the case that higher protein consumption paired with AAS is particularly nephrotoxic rather than Boldenone itself. There is also the possibility the Boldenone was counterfeit, as there was no purity testing within the study.

---

[113] Tatem AJ, Holland LC, Kovac J, Beilan JA, Lipshultz LI. Nandrolone decanoate relieves joint pain in hypogonadal men: a novel prospective pilot study and review of the literature. Transl Androl Urol. 2020 Mar;9(Suppl 2):S186-S194. doi: 10.21037/tau.2019.11.03. PMID: 32257859; PMCID: PMC7108994.
[114] Papaspiliopoulos A, Papaparaskeva K, Papadopoulou E, Feroussis J, Papalois A, Zoubos A. The effect of local use of nandrolone decanoate on rotator cuff repair in rabbits. J Invest Surg. 2010 Aug;23(4):204-7. doi: 10.3109/08941939.2010.481007. PMID: 20690845.
[115] Wang VM. Important preliminary findings on the potential role for nandrolone decanoate in the treatment of chronic rotator cuff tears. J Bone Joint Surg Am. 2011 Dec 7;93(23):e1441-2. doi: 10.2106/JBJS.K.01213. PMID: 22159866.
[116] Kantarci UH, Punduk Z, Senarslan O, Dirik A. Evaluation of anabolic steroid induced renal damage with sonography in bodybuilders. J Sports Med Phys Fitness. 2018 Nov;58(11):1681-1687. doi: 10.23736/S0022-4707.17.06763-9. Epub 2017 Nov 17. PMID: 29148625.

93. HGH will improve your sleep quality

Within bodybuilding circles HGH is mentioned as a surefire way of improving sleep quality. It is undeniable that GH will enhance sleep quality in many people. People with hypothalamic dysfunction have low levels of both GHRH and GH. This is because the hypothalamus is not producing enough GHRH to stimulate GH production. Consequently, they experience particularly poor sleep in the first half of the night, with reduced deep sleep quality and less time spent in delta wave sleep

However this does not factor in how growth hormone affects sleep apnea. In a review paper on Growth Hormone treatment for children with Prader-Willi Syndrome titled 'The Impact of Growth Hormone Therapy on Sleep-Related Health Outcomes in Children with Prader–Willi Syndrome: A Review and Clinical Analysis' reviewed growth hormone treatments effect on sleep apnea[117]. Although researchers acknowledged there were conflicting results, they concluded there is some connection between sleep apnea and growth hormone treatment, and that Adenotonsillectomy should be performed before starting GH therapy.

This is particularly concerning for those who use growth hormone within bodybuilding circles. Sleep apnea is very common in bodybuilding circles. A study titled 'Associations of obstructive sleep apnea with truncal skeletal muscle mass and density' found that "OSA was associated with an increased skeletal muscles mass in both men and women" [118]. Clearly bodybuilders with larger amounts of muscle mass are more at risk of developing sleep apnea, and adding in supratherapeutic doses of Growth Hormone into the equation will not only worsen your sleep quality, through the risk of (and increased severity of) sleep apnea, but this condition can potentially be life threatening. HGH administration should be approached with caution.

---

[117] Zaffanello M, Pietrobelli A, Piacentini G, Guzzo A, Antoniazzi F. The Impact of Growth Hormone Therapy on Sleep-Related Health Outcomes in Children with Prader-Willi Syndrome: A Review and Clinical Analysis. J Clin Med. 2023 Aug 24;12(17):5504. doi: 10.3390/jcm12175504. PMID: 37685570; PMCID: PMC10488332.

[118] Matsumoto T, Tanizawa K, Tachikawa R, Murase K, Minami T, Inouchi M, Handa T, Oga T, Hirai T, Chin K. Associations of obstructive sleep apnea with truncal skeletal muscle mass and density. Sci Rep. 2018 Apr 25;8(1):6550. doi: 10.1038/s41598-018-24750-z. PMID: 29695811; PMCID: PMC5916913.

94. Halotestin has x effect on HPT axis

Steroids shut down normal Testosterone function via the HPT axis. When you administer exogenous Testosterone (or other androgens), the hypothalamus recognizes these high androgen levels and thus decreases its secretion of gonadotropin-releasing hormone (GnRH). GnRH is responsible for the downstream production of luteinizing hormone (LH) and follicle-stimulating hormone (FSH), which are crucial for stimulating the testes to produce testosterone and sperm. Without sufficient LH, the testes reduce natural Testosterone production. E2-beta Estradiol and progestins also suppress the axis.
Different AAS suppress the HPT axis to varying degrees. The 19 nortestosterone derivatives seem to be the most suppressive as they also have a higher affinity to activate progesterone receptors which causes antigonadotropic activity similar to AR activation.

There have been many studies on Fluoxymesterone (Halotestin) that show highly varying effects on HPT axis, so any general claims on how suppressive Halotestin is, are wrong. The level of suppression seems to be highly varied.

95. Trenbolone is 7.5x more anabolic than Testosterone

As mentioned before (in myth 82) the anabolic:androgenic ratios are very poor predictors . These measurements are limited and don’t directly translate to real-world outcomes in humans. The most famous critique of this ratio and the distinction of the terms anabolic and androgenic comes from David Handelsman. They are based on rodent models that translate very poorly. This is demonstrated in Trenbolone’s anabolic:androgenic ratio.

There are a wide range of anabolic and androgenic ratings demonstrating unreliability of these measurements[119] [120], as it depends on the specific ester of Trenbolone used (Acetate, Enanthate, no ester), the reference standard (Testosterone or Methyltestosterone), and whether administration was oral or via injection. Also the dosage of Trenbolone seems to affect its anabolic:androgenic rating. Lower doses seem to be more selective for stimulating anabolic effects without an effect on the seminal vesicles. As such Trenbolone has been referenced as shown effects akin to that of a SARM[121]. One thing people overlook when it comes to anabolic:androgenic ratios is the metabolism of the steroid. Trenbolone after entering the body hydrolyses rapidly into its metabolite 17-beta-trenbolone[122] [123], which is an AR agonist comparable to DHT (dihydrotestosterone)[124], thus will clearly have an androgenic effect far and beyond what is described in its anabolic:androgenic ratio.

---

[119] Neumann F. Pharmacological and endocrinological studies on anabolic agents. Environ Qual Saf Suppl. 1976;(5):253-64. PMID: 782871.
[120] .Borodi G., Turza A., Camarasan P.A., Ulici A. Structural studies of Trenbolone, Trenbolone Acetate, Hexahydrobenzylcarbonate and Enanthate esters. J. Mol. Struct. 2020;1212:128127. doi: 10.1016/j.molstruc.2020.128127.
[121] Yarrow JF, McCoy SC, Borst SE. Tissue selectivity and potential clinical applications of trenbolone (17beta-hydroxyestra-4,9,11-trien-3-one): A potent anabolic steroid with reduced androgenic and estrogenic activity. Steroids. 2010 Jun;75(6):377-89. doi: 10.1016/j.steroids.2010.01.019. Epub 2010 Feb 4. PMID: 20138077.
[122] Bauer ER, Daxenberger A, Petri T, Sauerwein H, Meyer HH. Characterisation of the affinity of different anabolics and synthetic hormones to the human androgen receptor, human sex hormone binding globulin and to the bovine progestin receptor. APMIS. 2000 Dec;108(12):838-46. doi: 10.1111/j.1600-0463.2000.tb00007.x. PMID: 11252818.
[123] Borecki R, Byczkiewicz P, Słowikowska-Hilczer J. Impact of trenbolone on selected organs. Endokrynol Pol. 2024;75(3):267-278. doi: 10.5603/ep.99130. Epub 2024 Jun 18. PMID: 38887114.
[124] Ibid 121

96. All steroids improve insulin resistance

Testosterone (TRT) holds tremendous clinical significance in treating metabolic disorder by improving body composition and glucose metabolism[125]. Its thought that Testosterone increases insulin sensitivity by decreasing the levels of cytokines (TNFa and IL6)[126]. As a result, it's widely extrapolated by many users that other androgens will improve insulin resistance, however this is not exactly the case. For instance, Nandrolone, one of most well studied AAS, has been shown to increase insulin resistance in rats, specifically within the liver, and even more shockingly within the muscle over prolonged use[127]. This should be particularly concerning for bodybuilders, as adjunct use of insulin and IGF-1 would have diminishing results after prolonged usage. Insulin resistance within the muscle specifically is a career ender for bodybuilders as it makes it harder for muscles to take in these nutrients, reducing their ability to grow and recover.

97. Anadrol isn't estrogenic

Anadrol (Oxymetholone) is not a substrate for aromatase and hence cannot be aromatized into estrogenic metabolites, but has a moderate binding affinity to the estrogen receptors[128]. Its been speculated it also inhibits the clearance of Estrogen through the body. As such it is probable that using an aromatase inhibitor would not help to prevent estrogenic side effects such as Gynecomastia on Oxymetholone, which may only be alleviated by using a SERM (Selective Estrogen Receptor Modulator) such as Raloxifine, or through surgery. Its been reported

---

[125] Corona G, Rastrelli G, Vignozzi L, Barbonetti A, Sforza A, Mannucci E, Maggi M. The Role of testosterone treatment in patients with metabolic disorders. Expert Rev Clin Pharmacol. 2021 Sep;14(9):1091-1103. doi: 10.1080/17512433.2021.1938548. Epub 2021 Jun 21. PMID: 34085587.
[126] Malkin CJ, Pugh PJ, Jones RD, Kapoor D, Channer KS, Jones TH. The effect of testosterone replacement on endogenous inflammatory cytokines and lipid profiles in hypogonadal men. J Clin Endocrinol Metab. 2004 Jul;89(7):3313-8. doi: 10.1210/jc.2003-031069. PMID: 15240608.
[127] Frankenfeld SP, de Oliveira LP, Ignacio DL, Coelho RG, Mattos MN, Ferreira AC, Carvalho DP, Fortunato RS. Nandrolone decanoate inhibits gluconeogenesis and decreases fasting glucose in Wistar male rats. J Endocrinol. 2014 Jan 8;220(2):143-53. doi: 10.1530/JOE-13-0259. PMID: 24403377.
[128] Ibid 110

anecdotally that Masterone may prevent Gynecomastia development from Oxymetholone however it's unclear why this happens.
Additionally its possible for users to experience both androgenic and estrogenic side effects from Oxymetholone as its metabolite Mestanolone, is thought to be an orally active version of Androstanolone/DHT, which is inactivated by 3α-hydroxysteroid dehydrogenase (3α-HSD) in skeletal muscle, but likely produces androgenic activity similar to that of DHT in the prostate and hair follicles.

98. Water retention from a compound is a mild side effect

Water retention is a well known side effect of many compounds, like growth hormone. A paper titled 'The effects of growth hormone on body composition' reviewed this phenomenon, and mentioned that Acromegalic's extracellular water was shown to be ~25%, whereas GH-deficient adults have ~15% extracellular water[129]. Clearly there is a substantial increase in extracellular fluid retention from growth hormone use. However, many regard this mistakenly as a mild side effect. Heart failure and Acromegaly have been associated since 1886. It has been shown that 25%-85% of Acromegalic patients have Left Ventricular Hypertrophy[130]. This begs the question, is the increased cardiovascular risk due to GH/IGF-1's hypertrophic effects or the water retention associated with it. Well it seems like it's a combination of both[131] [132]. Using two

[129] Brummer RJ, Bengtsson BÅ. The effects of growth hormone on body composition. Asia Pac J Clin Nutr. 1995 Mar;4(1):151-5. PMID: 24394272.
[130] Bogazzi F, Lombardi M, Strata E, Aquaro G, Di Bello V, Cosci C, Sardella C, Talini E, Martino E. High prevalence of cardiac hypertophy without detectable signs of fibrosis in patients with untreated active acromegaly: an in vivo study using magnetic resonance imaging. Clin Endocrinol (Oxf). 2008 Mar;68(3):361-8. doi: 10.1111/j.1365-2265.2007.03047.x. Epub 2007 Sep 14. PMID: 17854389.
[131] Mosca S, Paolillo S, Colao A, Bossone E, Cittadini A, Iudice FL, Parente A, Conte S, Rengo G, Leosco D, Trimarco B, Filardi PP. Cardiovascular involvement in patients affected by acromegaly: an appraisal. Int J Cardiol. 2013 Sep 1;167(5):1712-8. doi: 10.1016/j.ijcard.2012.11.109. Epub 2012 Dec 4. PMID: 23219077.
[132] Colao A, Ferone D, Marzullo P, Lombardi G. Systemic complications of acromegaly: epidemiology, pathogenesis, and management. Endocr Rev. 2004 Feb;25(1):102-52. doi: 10.1210/er.2002-0022. PMID: 14769829.

compounds that are associated with fluid retention may lead to an increased cardiovascular risk above and beyond what each on their own may induce. Water retention from a compound should not be disregarded and is associated with many adverse health effects.
For instance, Growth Hormone + Testosterone.
Growth hormone increases the activity of Sodium-Glucose Co-transporter 1 (SGLT1), which leads to increased reabsorption of sodium and glucose from the kidneys back into the circulation, and also the activity of Epithelial Sodium Channel (ENaC)[133] [134]. Increased SGLT1 and ENaC activity boosts sodium reabsorption, leading to water retention with growth hormone use since water follows sodium. Testosterone co-administration will likely worsen the state of water retention caused by growth hormone. Testosterone could directly stimulate both the renin-angiotensin system [135](which plays a role in regulating blood pressure and fluid balance) and ENaC, leading to further sodium and water retention.

99. Growth hormone causes Carpal Tunnel Syndrome by its effects on connective tissue

Carpal tunnel syndrome from the use of Growth Hormone has been poorly understood. Many in bodybuilding circles used to test if HGH was real by mega-dosing it and seeing if they developed symptoms of carpal tunnel syndrome. It was thought that GH caused Carpal Tunnel Syndrome by an increase in connective tissue, however experts now attribute it to water

---

[133] Kamenicky P, Viengchareun S, Blanchard A, Meduri G, Zizzari P, Imbert-Teboul M, Doucet A, Chanson P, Lombès M. Epithelial sodium channel is a key mediator of growth hormone-induced sodium retention in acromegaly. Endocrinology. 2008 Jul;149(7):3294-305. doi: 10.1210/en.2008-0143. Epub 2008 Apr 3. PMID: 18388193; PMCID: PMC2527214.
[134] Tavakkolizadeh A, Shen R, Jasleen J, Soybel DI, Jacobs DO, Zinner MJ, Ashley SW, Whang EE. Effect of growth hormone on intestinal Na+/glucose cotransporter activity. JPEN J Parenter Enteral Nutr. 2001 Jan-Feb;25(1):18-22. doi: 10.1177/014860710102500118. PMID: 11190985.
[135] Mishra JS, More AS, Gopalakrishnan K, Kumar S. Testosterone plays a permissive role in angiotensin II-induced hypertension and cardiac hypertrophy in male rats. Biol Reprod. 2019 Jan 1;100(1):139-148. doi: 10.1093/biolre/ioy179. PMID: 30102356; PMCID: PMC6335213.

retention. Wrist Edema from GH usage can be managed through manipulation of water retention, and doesn't require unnecessary surgeries.

100. MENT as a male contraceptive

Trestolone (MENT) began clinical development for its potential as a male contraceptive in 1993 and development stopped in 2013, and its unclear if development is continuing. Its common for steroid users to think that they cant (or are unlikely to) get their partner pregnant when using AAS, especially those using MENT because of its specific studies into male contraception, however this is not the case. MENT came out as a ‘class leader’ for the potential to be a male contraceptive because of its high androgenic potency, its long acting contraception (19-nortestosterone derivatives also have progestogenic/antigonadotropic activity leading to relatively more suppression than seen by other classes of AAS), and its prostate-sparing effect (not a substrate for 5-alpha-reductase).
Although MENT was the ideal candidate for male contraception, it didn't reach the efficacy needed to be marketed as a male contraceptive. Trials demonstrated that MENT alone does not suppress sperm counts to levels which could be considered to be reliable for contraceptive purposes (azoospermia or <1 million/mL) in all men[136]. Only ~ two-thirds of patients had sufficient suppression, which was similar to the effects seen with testosterone alone in other studies[137].
There are many anecdotes in bodybuilding circles of guys who didn't use protection whilst on MENT, mistakenly believing it would prevent pregnancy, and still got their partner pregnant despite its contraceptive-like qualities. Clearly, AAS users should approach ‘safe-sex’ no different to a natural or someone off cycle.

---

[136] von Eckardstein S, Noe G, Brache V, Nieschlag E, Croxatto H, Alvarez F, Moo-Young A, Sivin I, Kumar N, Small M, Sundaram K; International Committee for Contraception Research, The Population Council. A clinical trial of 7 alpha-methyl-19-nortestosterone implants for possible use as a long-acting contraceptive for men. J Clin Endocrinol Metab. 2003 Nov;88(11):5232-9. doi: 10.1210/jc.2002-022043. PMID: 14602755.
[137] Ibid.