

In our society a reality has at last become accepted: Age and sexual gender do not dictate athletic potential. With the main stream acceptance of high quality sports supplementation came stronger fitter bodies of all ages and entire thirty, forty and fifty-something generations pouring into the once undisputed young man's domain...the gym.

The term "sports chemistry" once meant anabolic/androgenic steroids (AAS) and seedy images of team doctors closing their office doors to inject some illicit substance into an already enhanced athlete. Oh how things have changed!

I often marvel at the way that mere perception alters the responses one will receive to any given statement of fact,... so let's open with a good one:

Everything good or bad in life and bodybuilding depend upon the chemistry we introduce our bodies to.

Before anyone gets their panties in a bunch and dials up all of the three letter organizations that investigate illegal activities, let me explain that statement of fact. All organic and inorganic matter is made up of chemicals and chemical substrates. Any living organism (uh, like you and me) not only has the ability to, but an absolute need for interaction with the environment around it through Action/Reaction Factors. As an example, think of the saturated fat in red meat and eggs (don't get me started on synthetic trans fats). The liver utilizes saturated fats to manufacture or synthesize a steroid called 5-Cholesten-3b-ol. (Most people know this chemical by the name of cholesterol) Through Action/Reaction Factors controlled and induced by natural endogenous (manufactured inside the body) enzymes the body (begins its illegal activities) utilizes a series of chemical biosynthesis pathways that include the following:

- (1) Cholesterol >
- (2) Pregnenolone >
- (3) Dehydroepiandrosterone (DHEA) >
- (4) 4-Androstenedione >
- (5) Testosterone

Officer, arrest that body! It just manufactured an illegal AAS and administered it without a doctor's prescription.

If this body had not been provided with saturated fats (chemical substrates) it simply would have utilized unsaturated fats as the initial testosterone precursor. If the intake of all fats had been excluded, the eventual outcome would be predominant loss of lean muscle mass, energy, and libido with dramatic increase of female pattern fat deposits.

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The term "sports chemistry" now refers to everything from diet and supplementation to hormone therapy with testosterone, growth hormone (GH), IGF-1, HCG, and progesterone. Thanks to the major advances made by the sports supplement industry the main differences between each of these is the issue of prescription -vs.- OTC since each is merely a chemical/chemical substrate. This fact has leveled the playing field for athletes of all ages, level and gender by blurring the fine line between chemical muscle enhancement and nature.

Interestingly enough, training and the results that come from it are nothing more than chemistry as well. What few people realize is that there are specific training protocols that result in specific responses. This again is controlled by a series of Action/Reaction Factors and, to a great degree, are readily altered to induce a specific response of choice.

Testosterone, GH, IGF-1, insulin, and many other hormones and hormone-like substances are manufactured endogenously by the body in response to different training stimulus if the proper chemical substrates are provided. Since each of these has multiple and significant different effects upon an individuals physiology, and more specifically upon muscle and fat tissue, it is therefore possible to significantly effect the outcome of a chosen training and supplemental protocol. I realize that many have unnecessarily accepted the level of mediocrity that is often justified by the catch-all words "genetic potential" and touted by way to many magazine articles. This of course means that I am about to make some bold and crazy statement to the contrary. (Definition of crazy: Not accepted by the main stream publications as their current point of view) Anyone can significantly effect their own genetic potential in a favorable way and by specific

choice. (Ya, I said and have proven that many times) I am not saying that everyone can be an Arnold, Dorian, or Ronnie, but I am factually stating that through specific-intent protocols and phases an individual can significantly effect specific results far greater than ever imagined by the average athlete regardless of age or sexual gender. (Ya, I said that too) Okay, I hate the quoting research sites game simply because any idiot can alter a quote or statistic of most research results. But just to momentarily quiet those who erroneously depend upon them for sole validity (instead of actually training and being living examples themselves etc.) I would like to point out a few actual findings. (Geez, you would think a few pictures would do the job, huh?)

Sometimes good information comes from unexpected places. In a study done to evaluate what effects 8 weeks of heavy weight training has upon serum lipid and lipo protein concentrations scientist made an interesting series of discoveries.

As the scientist analyzed the data from 32 college males and females after concluding an 8 week heavy weight training protocol they realized that the test subjects muscle fibers showed evidence of converting from type-I (slow twist) to type-II (fast twist) muscle fibers. First realize that this occurred in only 8 weeks. Second, the fact that the aerobic muscle fibers changed into size/strength oriented (therefore high growth potential) muscle fibers in itself validates the potential for specific training stimulus for specific results issue. By the way, it is good that the researchers were able to extract this finding from their research project. (Research projects are not cheap to fund) In fact an 8 week period is not enough time to produce any type of result concerning lipid profiles.

Each of us possesses type-I (slow twist) and type-II (fast twist) muscle fibers in different ratios in different muscle groups. The so-called "average" individual initially possesses about a 50/50 body ratio. Type-I fibers are considered low growth potential aerobic oriented muscle fibers and type-II fibers are considered high growth potential anaerobic/strength muscle fibers. Obviously the greater an athlete's muscle fiber ratio favors type-II fibers, the greater the potential for muscular growth and strength increase. The ability to alter the ratio through specific training protocols means also the ability to effectively alter genetic make-up.

Influences of resistance training on serum lipid and lipo protein concentrations in young men and women. Journal of Strength and Cond. Res. 14(1):37-44, 2000.

Hormonal responses to high and moderate intensity strength training exercise. Eur.J. Appl Physiol. 82:121-128, 2000

A study done in Oslo Norway examined long term and short term (acute) hormone responses of 9 experienced test subjects to two different training intensities. The high intensity work-out required the test subjects to perform free bar back squats (front and back) using 100% of their 3 rep max for sets. The moderate intensity work-out required the athletes to do the same exercises utilizing 70% of their 3 rep max for sets. Rest periods were 4-6 minutes.

The test subjects blood samples were taken before, after 30 minutes into, and every 15 minutes for the first hour after each work-out. Next, blood samples were taken at 3, 7, 11, 22, and 23 hours post work-out. The analysis of the blood samples was for:

(1) Hormones positively affecting anabolism (tissue synthesis): LH (leutenizing hormone), FSH (follicle stimulating hormone), testosterone (free), insulin, growth hormone (GH), and insulin-like growth factor-1 (IGF-1).

(2) Hormones that affect catabolism (tissue wasting): ATCH (adrenocortotropic hormone) and cortisol.

Other substrates analyzed include creatine kinase and lactate. (As indicators of actual training intensity)

The test results verified that high intensity training induced a significantly higher level of testosterone and cortisol secretion (and moderate intensity did not) as a short term hormonal response. Though both testing protocols showed a decreasing testosterone level in the post-training hours, the high intensity training results were consistently higher than those of the

moderate intensity. LH and FSH levels were not significantly altered as a result of either training intensity. This is a huge finding that exceeds the evidence of higher intensity training protocols being the better method for triggering a significant increase in testosterone.

The majority of endogenous (naturally produced inside the body) testosterone synthesis in males is handled and regulated by the hypothalamus-pituitary-testes-axis (HPTA). It all begins when the hypothalamus receives neuro-net impulses that signal the release of leutenizing-hormone-releasing-hormone (LHRH) which in turn tells the pituitary gland to release leutenizing hormone (LH). LH then makes contact with the testes Leydig's cells that produce testosterone and release it into the vascular system. However, there is a secondary testosterone synthesis pathway that may be hyper-activated as a result of high intensity training protocols.

The adrenal glands produce several different hormones. The hormone of interest for this issue is called dehydroepiandrosterone (DHEA). DHEA is an androgen that is responsive to enzymic alterations called conversions. Two of the enzymic conversion products of DHEA are 4-androstenedione and 4-androstenediol which in turn are converted into testosterone by the 17-BHSD and 3-BHSD enzymes respectively. Of course under normal metabolic conditions there are several other potential conversion products possible including estrogens. But high intensity training appears to foster a pro- 17 & 3- BHSD environment that results in a favorable conversion rate of these two DHEA conversion products to testosterone.

So specific training does have specific hormonal responses. What does that have to do with altering genetic potential?

Histochem Cell. Biol. 113(1): 25-29, 2001

It is well documented that consistent heavy resistance training actually increases the concentration (number) of androgen/anabolic receptor-sites on trained muscle tissue. All AAS, whether produced endogenously or provided exogenously (form outside the body), exert their serious anabolic effect by binding or merging with androgenic/anabolic receptor-sites on muscle cells. If muscle cells and fibers possess a greater number of these receptor-sites they also possess a greater genetic growth potential. Guess what. Yup, testosterone is an AAS.

J. Streng Cond. Res. 14(1): 102-113, 2000

So you have been told that you can not alter the peak of your bicep or build a wider chest and back? To a great degree...B.S. Muscle is not merely a bunch of fibers that attach to bones contracting and relaxing to provide potential movement. Muscle is composed of multiple fiber sizes and types. Each fiber is made up of different size cells with different individual metabolisms, and different contractile potential and amino acid profiles. This means that during different exercises and different angles of execution there is a different recruitment pattern of different regions of the muscle (confirmed by EMG). Therefore it is possible to trigger the growth process on a more site-specific basis. So is it obvious yet that you can utilize specific protocols to induce growth in specific areas resulting in an alteration in shape?

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It is too often accepted that age is the final deciding factor for muscular growth potential. Without a doubt this is the silliest reason of all for anyone to endure mediocrity.

When we are discussing the issues of muscular accruement we are actually discussing which side of the protein-turn-over-rate (PTOR) an individuals body favors. The PTOR is the rate at which an individuals body builds new proteins (anabolism) and destroys old ones (catabolism). This means that for actual muscular accruement to occur an athlete's body must build more new proteins than it destroys each day.

At the University of Texas in Galveston researchers utilized amino acid tracing techniques to study 48 healthy men. The protocol was intended to track the rate at which test subjects bodies created muscle proteins and destroyed muscle proteins. What the researchers found was that the PTOR (protein turn over rate) for both younger and older men is nearly the same. This means that an individuals potential for lean muscle mass gain is potentially the same regardless of age.

It seems that the reason for lean muscle tissue loss and weakening is not necessarily age related.

A sedentary life style is a sure way to cause a dramatic decline in endogenous anabolic hormones such as testosterone, GH and IGF-1. Poor dietary habits not only increase insulin insensitivity but also alter an individuals body biochemistry to a point that disallows the ability to properly utilize protein from food.

Bottom line here is that training protocols, diet, hormone profiles, and life style are the main deciding factors for alterations in "genetic potential" regardless of age and sexual gender. Building The Perfect Beast is a matter of choice and letting go of the eternal dogma that holds each of us in mediocrity. Oh ya, and...

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This may appear an over simplification of a normally complicated topic, but in truth it is the tip of the ice burg and only the introduction to what is possible for anyone who chooses, and what has been embraced by those have experienced the reality.