

A close-up photograph showing a white, powdery substance being poured from a white plastic container onto a dark wooden surface. The powder is piled up in the center, with some smaller clumps scattered around. The background is dark and out of focus.

The Essential Guide to Bodybuilding Supplements

INCLUDES ESSENTIAL ADVICE ON HOW TO AVOID SCAMS!

***START GETTING MORE FROM YOUR WEIGHT LIFTING NOW
WITH THIS ESSENTIAL GUIDE TO BODYBUILDING SUPPLEMENTS!***

Feel even stronger and more powerful than you would from body building alone!

The Essential Guide To Bodybuilding Supplements

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Introduction to Bodybuilding Supplements

So you've decided to start supplementing your workouts. Hopefully this means you've already mastered your exercise regime and your diet, and that you've come here to get fully informed on what's out there and what works. That's a wise move as there's a lot of bad advice out there and even more marketing hype that can lead you to waste money or even damage your health.

If you're looking for a quick fix that will give you pounds of lean muscle with no work then you're barking up the wrong tree. Bodybuilding is about putting hard work in at the gym, and that's what makes it such a great sport. And while a large proportion of bodybuilders will take at least a protein shake, *no* supplement is completely necessary and you can make great gains on a purely natural diet.

What supplements can do though is to give you an edge and make you feel even stronger and more powerful than you would from weight lifting alone; helping you hit the gym with extra vigour and motivation. At the same it'll help you really capitalise on your workouts, making the most of your hard work and making sure none of your lifting goes to waste. Furthermore, supplements can actually improve your health generally by making sure you get all

the nutrients and vitamins you need to supply your body with energy and help with growth and repairs.

There's also an impressive range of supplements that provide a variety of benefits from extra energy, to heightened anabolism, to fat burning, to increased vascularity, to a better pump, to a deeper anabolic sleep, to better general health and protection from illness. Knowing which of these work, which will benefit your particular training goals and how to take them can save you a lot of time and money and bring you quick, healthy gains. A good understanding of your own biochemistry and the workings of the many products out there can help you work with your body to improve your health and muscle building potential.

Avoiding Scams

Unfortunately a lot of bodybuilding supplements are marketed to those who want quick results that don't exist. While experienced bodybuilders will be clued in on what's hype and what's real, those who have been struggling to get results will be more receptive to a product that says on the front that it can promise 200% more muscle in two weeks. Such claims are nonsense and based on poor, biased research but sadly are also necessary for products to be successful in an overcrowded market. Always be aware of product descriptions that use CAPITALS, *Italics* and excessive exclamation marks!!! And don't assume that just because a famous bodybuilder is in the advert that they've ever actually tried the supplement they're endorsing.

So hyperbolic claims are one thing to be wary of (though don't assume this means the product is useless). A more subtle approach to watch out for is products trying to make themselves sound more potent than they are by warning of 'side effects' or advising cycling. Expect to see the word 'anabolic' used in much of the marketing campaigns (which simply means muscle building as opposed to catabolic which means burning for energy) and lots of products ending in 'ol'. Nothing legal is as potent as anabolic steroids yet and with the many side effects that come with steroids you wouldn't want them to be.

Also be wary of products that try to do much. There's no such thing as a one stop shop in bodybuilding and too many ingredients mixed together in a single product can end up cancelling each other out – particularly as the way you take them should vary anyway. Protein shakes that contain creatine for example are actually offering no extra benefits and you'll still have to supplement with additional creatine products. That doesn't mean this products aren't any good as protein shakes, it's just that the creatine has been thrown in as an added incentive with no real attention paid to its effectiveness.

Some supplements however are downright scams that knowingly lie about their products. I recently tried a 'cognitive enhancer' that I later learned was 99.9% alcohol and water, with the other ingredients being leaves from trees with no medicinal value (this was quite clever as the alcohol made it feel as the product was doing something). This product, named 'Cognis Extract', was literally pushed on me by the lady in my local health store who was clearly earning commission had no qualms about selling me utter rubbish. While some products just don't work, others are downright dangerous and buying supplements from e-bay with no prior knowledge of what's in them is just dumb and

almost as dangerous as buying from back alleys. So only buy from e-bay if you have good reason to believe the seller is reputable.

So you need to look out for people with ulterior motives. This is true of people in health stores but also true of many journalists and writers and even the internet isn't safe. Hailed as the ultimate tool for freedom of speech and expression the internet is actually still run largely by corporations. Most bodybuilding websites are either owned by a supplement company (for example, T-Nation is owned by Biotest and runs many biased reviews of their own product) or engage in affiliate schemes, earning commission by recommending certain products and linking to them on their site.

Always look around a site first before trusting its reviews. Look for sponsors, affiliate products or any other reason that a site might be giving you biased information. One source of generally unbiased information is bodybuilding forums – go on there and ask about the product you're looking into (or just search for a previous discussion on the topic). Even then though be careful – often the people who write on the forums are biased themselves and in other instances forum moderators have been known to delete posts that are bad for business. That's getting a bit paranoid however as generally most forums will be predominantly unbiased.

What is a problem on forums however is simple lack of knowledge and it's possible that the person you're speaking too has been taking the supplement wrongly, experiencing placebo effects (where you fool yourself into feeling effects because you're expecting too) or are just unique in their reaction to it – different people genuinely do find different supplements to be more or less effective.

All you can really do then is to research the supplement thoroughly and make sure you always know the exact ingredients. This book contains a list of the main ingredients used in many supplements, so look and decide for yourself if it's going to work and research further any ingredients you're unsure of. If the ingredients are not available on the pot or on the website then request them, if you don't get an answer then ask yourself why? Don't mess with your body by filling it with things you know nothing about.

In conclusion then, read this book, do your research and definitely don't buy into the hype.

Your Stack

Your 'stack' refers to the list of ingredients you're regularly adding to your body. This means not only each product/brand, but also the ingredients within each supplement. Don't just go popping pills randomly and certainly don't trust the word of supplement companies. Do your research on which products work and which don't, then tailor your stack to mirror this exactly and to perfectly suit your training goals. For example, the testosterone booster I find to be most effective is Forza-T, which I also like for its connection to Sylvester Stallone (a personal hero of mine), but unfortunately the UK version has been so heavily watered down as to be almost useless. Many of the key ingredients are considered too strong for UK law and as such have been removed. Most of these ingredients are difficult and illegal to get hold of in here, but fortunately one of the ingredients, tribulus, is not. The reason tribulus was removed was because by UK law its inclusion would have meant Forza-T would have to be renamed to mention it in its title. Therefore I can supplement Forza-T with tribulus myself as part of my stack making it a far more potent mix again.

Cycling and Loading

Some claim that 'cycling' and 'loading' is nothing but a marketing strategy on the part of supplement companies hoping to make their products sound more powerful and steroid like (see above). While it may not be completely necessary for best results however, it can actually save you money so it's worth following the advice you read on the packet/online. In the descriptions that follow then I may occasionally include recommendations regarding cycling and loading. If not, either follow the instructions on the packet or look online. If your product doesn't come with any instructions then be very wary, especially if you got it online, and certainly don't attempt to guess – how and when you take your supplements is almost as important as what you take.

Basic Supplements

Whey Protein – Whey protein is definitely the number one supplement and if you only use one supplement you should make it whey protein. Whey is a by-product of the cheese making process and it a highly concentrated source of protein with a high biological value that ensures your body absorbs and utilises as much of that protein as possible.

The Whey comes as a powder that you mix into milk or water (it's delicious in milk, foul in water) and it can be worthwhile getting a shaker to make sure it's properly mixed and you don't have lumps of sticky protein floating in your drink. It also comes in two different forms, isolate or concentrate. While the differences are minimal, whey isolate is slightly better quality containing more grams of protein and being quicker to absorb (though can't be taken with milk). The differences are actually minimal however and only really noticeable if you're a professional bodybuilder/athlete, meaning that for the average Joe isolate isn't worth the considerable extra cost (unless you're lactose intolerant when isolate is your only option).

When trying to build muscle it has been said that we should aim to consume one gram of protein for every pound of muscle. While this is probably excessive, we certainly need more protein than we'd

normally eat in a day if we're aiming to make rapid gains in the gym. Unfortunately, consuming this amount of protein is downright impractical and that's where protein shakes come in – as a powerful and quick way to get a lot of quality protein into your system.

Protein shakes are normally taken once to three times a day and there are particular times when it's best to take them. The most important time is immediately after a workout when your body is at its most anabolic and looking for amino acids to repair the damage you've just done to your poor muscles. You have a window of about thirty minutes to consume your protein here and if you don't you'll really be wasting a lot of your hard work. If you only have one protein shake a day *this* should be when you take it. The second best time for a protein shake is in the evening just before you go to sleep. Again your body is highly anabolic during sleep and uses this time to recover after all the beatings it's taken during the day – again it'll need all the amino acids it can get. Finally the third best time for a protein shake is first thing in the morning – making sure you've given yourself a good supply to last you throughout the day. Don't make the mistake of thinking that you don't need all three doses on rest however, and even you're not training take one morning, afternoon and night to make sure they're well spread out. For best results it's also worth eating another source of protein when you drink your shake. The reason for this is that no protein

shakes contain all the 22 amino acids essential for bodybuilders, meaning that only by combining more than one type can you ensure your body has a constant supply of all of them.

Creatine – Creatine is one of the supplements that comes closest to being 'essential' and has many benefits, the most important of which being the energy it supplies the muscles with.

Creatine is always stored within the muscles and is used to convert ADP and AMP back in ATP. ATP, or 'Adenosine Triphosphate', is the energy source used by all organic creatures. A nucleotide of three phosphates powerfully bonded together, the body then breaks these bonds and uses the resultant energy release to power the muscles and other systems. Once this process is complete the body is left with ADP or AMP (Adenosine Diphosphate and Adenosine Monophosphate respectively) with just one or two phosphates. Once the store of ATP is depleted (after about three seconds of use) the muscle's supply of creatine kicks in, which it uses to convert the ADP and AMP back into ATP. This is known as the 'phosphagen system' and will supply the body with about 10-15 seconds more explosive power, after which the aerobic system will kick in.

Creatine is found in a selection of foods, notably red meat (so again vegetarians need to search for another source). However, if you supplement the body with extra creatine, the muscles will soak up

more providing them with extra energy. This can be useful for bodybuilders as well as other athletes such as sprinters or swimming and is why the product is so popular.

An added bonus of creatine for bodybuilders is that when the muscles store extra creatine they also store extra water, causing them to swell and get firmer with no extra work on your part. It's not unusual to gain an extra half an inch after just a few weeks of taking creatine.

When using creatine it's usual to take it around twice a day mixed with water. However in the first five days or so you will be advised to go through a 'loading' phase, taking around five a day to give your muscles a 'store' of creatine that you can subsequently 'top up'. While the effectiveness of loading creatine is disputed, for the small amount it will cost you there's no real reason not to follow instructions.

Weight gainers – Weight gainers remain one of the most successful supplements which is really a mystery considering what they actually contain. Essentially weight gainers are just a way of getting calories and these are hardly discriminated. While this may be useful for ectomorphs and others who have difficulty gaining weight, it would be far more pleasant, and probably cheaper, to just

eat lots of cake with protein shakes. As you can't convert fat into muscle however, even this seems like a pointless endeavour to me.

A Brief Description of Various Other Supplements/Ingredients

6-OXO – 6 OXO, also known as 4-Androstene-3,6,17-trione explaining why it's usually abbreviated, is an important ingredient in most testosterone boosting products as it increases the testosterone to oestrogen ratio.

Amino Acids – Amino acids are what make up protein, the 'building blocks of life'. When your body makes repairs using protein from protein shakes or natural sources it utilises specific amino acids and if these aren't available in your blood stream when it comes to use them the body won't be able to perform that function. The bad news is that supplying the body with them later on isn't enough – they need to be available at all times.

There are 22 amino acids that are necessary for bodybuilding and they are as follows: alanine, arginine, asparagine, aspartic acid, cysteine, cystine, glutamic acid, glutamine, histidine, isoleucine, leucine, lysine, methionine, ornithine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine and valine (cool names huh?). Some older sources will tell you that there only 20, while others will claim there are many more. For bodybuilders however, these 22 are

the essential amino acids that you should ensure to include in your diet or through supplementation.

You should already be getting all your amino acids from your diet which should be high in protein already. The difficult part however is that no single source of protein other than eggs contains all 22 – even protein shakes. This means that in order to get all the necessary amino acids you need to eat more than one protein source at every sitting, or alternatively, supplement the source with amino acids.

This can be particularly useful for vegetarians, especially vegans, as they have fewer sources of protein to choose from with those plant sources that do exist having fewer amino acids and a lower absorption rate.

Boron – Boron has been reputed by some supplement companies to raise testosterone levels though there is little evidence to support this theory. It is probably best for now then to wait until more evidence exists before parting with your hard earned (or otherwise) cash.

Caffeine – Caffeine is a stimulant that tricks the brain into feeling more awake. It is used by many people for many things, most usually as a pick-me-up for desk-jockeys first thing in the morning. However it also has many other benefits such as improved memory and concentration. More importantly for bodybuilders is the prospect of fat loss and increased energy and it can be found in many products that aim to do just that. Infact it's the key ingredient in most energy supplements and is found in everything from Red Bull and Relentless to the more training-focussed names such as Ener-G Shot.

Taking caffeine tablets however is ill-advised before a workout as it can put a strain on your heart and/or give you headaches. It can also badly interfere with your body clock and when I was on them I had such trouble sleeping that I became dependent on them during the day to stay awake.

Caffeine is a useful drug then, but works best in tea, coffee or soft drinks where it belongs.

Carnitine – An amino acid (as listed above) that promotes fat burning. However as well as burning other fats it also burns off triglycerides – an essential fatty acid (a 'good' fat). It also gives a mild energy boost.

Chitosan – Chitosan is alleged to block fat and studies have demonstrated its ability to block fat absorption in the stomach. However it may also block the absorption of other vital nutrients and personally I advise against using any supplement to lose fat; just limit your diet and do lots of CV.

Chromium – Chromium is a popular and effective fat burner, the most effective type being 'chromium picolinate'. It's used in many successful fat burning products, but again you should steer clear of these unless you've exhausted all other avenues.

Chrysin – Chrysin is a plant extract that prevents the conversion of testosterone into oestrogen. Testosterone obviously has many advantages for bodybuilders including enhanced muscle building, more energy and greater drive (and a better sex life). It is therefore common for bodybuilders to try and increase the amount of testosterone in their system. Chrysin won't have much effect on its own, but can't hurt as an addition to other testosterone boosters such as tribulus terrestris.

Colostrum – Colostrum aims to raise IGF-1 levels (Insulin-like Growth Factor) and is found in mother's breast milk.

Dandelion – Dandelion is a diuretic that can be used by bodybuilders pre-competition to dehydrate themselves (and so achieve a more ripped physique) and is found in products such as 'Taraxatone'. Such practice is not recommended however, simply halving your water intake 24 hours before a competition should be sufficient.

DHEA - DHEA (Dehydroepiandrosterone) is a testosterone booster found in many products that works best when stacked with Tongkat Ali and/or tribulus terrestris.

Essential fatty acids (EFAs) – Essential fatty acids play many roles in our body, improving our hair and skin, healing wounds, and even helping our bodies to absorb protein, hence their 'essential' status.

Many bodybuilders trying to limit their fat intake may inadvertently end up with a deficiency of their fatty acids and so supplementing with the essentials can be a good idea. The main two you need are linoleic and linolenic acid (omega-6 and 3) which can also be found in oily fishes such as tuna.

GABA – GABA, or gamma aminobutyric acid, is a product that aims to increase the amount of human growth hormone in your body which leads to muscle building and fat burning among. Growth hormone also improves healing and for the older bodybuilder growth hormone can even seemingly turn back the clock.

GABA works in two ways, firstly it forces the pituitary gland to release more growth hormone (some say up to 600% more but this sounds unlikely). At the same time it also acts as a serotonin re-uptake inhibitor which results in our brains having abundant serotonin. Serotonin, like melatonin, also signals to our bodies that it's time to sleep and so GABA is also a useful sleeping aid and best taken just before bed. Side effects also include a pleasant mood and a tingling sensation, the former of which means it's also used as antidepressant. The reason that the drowsiness is a 'good' thing is that sleep is when our body produces the most growth hormone. Basically then GABA works by shutting your body down then telling it to flood you with growth hormone.

Sylvester Stallone has recently advocated the use of HGH (Human Growth Hormone) for bodybuilding and anti-ageing – and he looks better now at 63 than he has done for years. HGH however is illegal in the UK and most states of the US which is why some bodybuilders turn to GABA (though GABA too has recently been

banned in the UK). Those hoping to get Stallone-type results however are going to be sorely disappointed and the effectiveness can be likened to ZMA when compared to anabolic steroids.

What you *will* get from GABA however is a lasting tiredness and feeling of numbness and indifference reminiscent of Pink Floyd's 'comfortably numb' that affects you into the next day. This is not only concerning and unpleasant, but also means that you'll feel lethargic during workouts which is far more destructive than the touted benefits are positive. I highly advise against using any supplement that messes with your brain chemistry and particularly ones that are essentially useless such as GABA.

Glutamine - Glutamine is the amino acid found most in muscle tissue. For bodybuilders then you can't get enough of this stuff and it can't hurt to supplement it. Still, you should find that a good protein shake contains it in large amounts anyway as do many food sources such as fish, egg, milk, pork, beef, chicken, yogurt, ricotta and cottage cheese, beans, spinach, parsley, cabbage and hemp seed. And even in nuts, vegetable juices and fermented foods. So there's probably no need to supplement.

Guarana – Guarana is the natural alternative to caffeine that gives a slower-starting but longer lasting high. It's found in most energy

supplements (best when combined with Ma Huang) and is also used in many weight loss products.

5-HTP – Once consumed, 5-HTP (AKA 5 Hydroxytryptophan) is converted in serotonin and supposedly helps suppress your appetite. This may work fine, but shouldn't be a concern for bodybuilders who need to eat massive amounts of protein even when 'cutting'.

Lipoic Acid – Lipoic acid is great when taken alongside creatine as it has been shown to enhance glucose uptake into skeletal muscle. This then means that essentially you're providing your muscles with not only more creatine, but greater ability to utilise this creatine. For this reason it's found in many creatine products (such as Cell Tech) but if it's not in yours you should add it to your stack. A highly recommended combination.

Medium Chain Triglycerides (MCT) – Medium Chain Triglycerides are fats that are less easily stored than ordinary fats. For this reason they are used in weight gainers.

Melatonin – Melatonin supplements are a hormone that instruct the body when to go to sleep. Sleep is important for bodybuilders, not only to ensure they have maximum energy in the gym, but also

because it's when growth hormone is produced by the pituitary gland. Use it if you have trouble sleeping, but otherwise steer clear – our body clock is dictated by a complex mix of internal and external cues and taking matters into your own hands will usually end up mixing things up worse.

Nitric Oxide – Nitric Oxide is a gas found in the human body that can vasodilatation – a process that causes the smooth muscle cells of blood vessels to dilate so allowing more blood flow. More blood flow means more blood (and so oxygen) where it's needed. For bodybuilders this means blood rushing to the muscles when we use them, resulting in a far greater feeling of being 'pumped' (as well as a better looking pump). This is not only motivating in the gym, but the extra oxygen means you can survive aerobic activity for longer. Interestingly it also means a bigger erection as blood rushes here too... Finally, it leads to increased vascularity (bulging veins) which is desirable for bodybuilders.

Phosphates – Phosphates are used in many creatine products to make more available for converting into ATP (without which creatine is useless). It is used in the creatine from EAS and it won't hurt to stack it alongside other creatines.

Pregnenolone – Pregnenolone is another hormone used for elevating testosterone. However it also raises progesterone – a female hormone that's involved in the catabolic process breaking down muscle. Best to avoid!

Pyruvate – Pyruvate is supplement that increases the ATP in your muscles (by enhancing the transport of glucose and protein into muscle cells) and is also used as a fat burner. Another one that's recommended on top of creatine products. Also found in red apples...

Saw palmetto – Saw palmetto has been used as a supplement to encourage a healthy prostate in men as well as an anti-oestrogenic, meaning it blocks oestrogen (the anti-testosterone) and may help improve the efficiency of testosterone products.

Taurine – Taurine is the second most abundant amino acid found in muscle (after glutamine, see above) so it's important to ensure you consume a good amount.

Tongkat Ali (AKA Long Jack) – Tongkat Ali is used to support the balance of male hormones (including everybody's favourite, testosterone!). It is a botanical supplement from Southeast Asia and works well alongside other testosterone boosters such as...

Tribulus Terrestris – Tribulus is one of the main ingredients in many testosterone boosters. Tribulus is a herbal supplement the active element of which is protodioscin, a cousin of DHEA.

Vanadyl Sulphate – Vanadyl is an insulin like supplement that makes muscles harder. This it does again through increasing glycogen storing in muscles so is recommended taken alongside creatine and/or nitric oxide (for the ultimate pump...).

ZMA - Zinc monomethionine aspartate and magnesium aspartate, is another ingredient in many testosterone boosters.

Vitamin Supplements

Cobalamin (Vitamin B12) – Vitamin B12 has many benefits but for bodybuilders in particular they help with the metabolism, carb burning and the maintenance of the tissue of the nervous system. The nervous system is the spinal chord and nerves carrying signals around the body from the brain, crucial obviously in the control of muscles. It's only available from foods of animal origin making B12 shots popular for many athletes and particularly vegetarian athletes.

Biotin – Biotin plays a key role in the utilisation of amino acids and also energy production. It's a popular supplement for bodybuilders as it is blocked by a substance known as Avidin which can be found in raw egg whites. This means that some bodybuilders develop a biotin deficiency which can be combated with supplementation.

Riboflavin (vitamin B2) - Riboflavin is useful for glucose metabolism, the oxidation of fatty acids and transporting hydrogen ions through the Krebs cycle aka the citric acid cycle is part of a metabolic pathway involved in the conversion of carbohydrates and fats into carbon dioxide and water to generate a form of usable energy.

One study has demonstrated that females require higher than RDA levels of Riboflavin to return levels of Riboflavin in the blood to normal after exercise. Supplementation therefore might be even more beneficial for women. Another study by Haralambie showed that Riboflavin supplementation improved muscular hyperexcitability (AKA cramping).

Vitamin A- Vitamin A not only helps with vision, but is also used in protein synthesis/anabolism and also the production of glycogen a key source of energy for the muscles. The average American has been shown to be low in vitamin A and strenuous activity (i.e. weight lifting) has been shown to disrupt the absorption of the vitamin, as has a low fat diet. Extra supplementation again can help limit this problem.

Vitamin E – Vitamin E is a powerful antioxidant, meaning it can protect the cell membrane and guard against free radicals, preventing the deterioration of cells from age or diseases such as cancer. The many catabolic and anabolic processes that take part in the human body and are crucial for bodybuilding are highly dependent on healthy cell membranes.

Niacin (vitamin B3) – Niacin is involved in a vast proportion of metabolic processes involved in energy production, which obviously

comes in handy down the free weights room. Niacin can also come in the form of nicotine acid which causes vasolidation – thus helping bodybuilders get the appearance of bulging veins that can earn them extra points in competition. Large doses of nicotinic acid however can hamper the body's ability to mobilise and burn fat so supplementation should be saved for pre competition.

Vitamin D – Vitamin D is important for the absorption of calcium and phosphorous making it vital for bodybuilders. Calcium is used in muscle contraction and contractions cannot be sustained without a good supply of calcium. It's also important in strengthening bones preventing injury and improving overall strength (ever seen unbreakable? You don't want to be Samuel Jackson's character...). Phosphorous meanwhile is important for quick powerful contractions and is the 'P' in ATP. As we've discussed elsewhere ATP is the universal fuel for all life and of particular importance for bodybuilders and other athletes. Vitamin D is found in dairy products and bodybuilders who keenly avoid fat may end up with a shortage.

Thiamine (vitamin B1) – Thiamine is required for muscle growth. It's also involved in haemoglobin – found in red blood cells – which transports oxygen through the body. This is important for athletes exerting themselves over sustained periods once the aerobic system

kicks in. Thiamine has been demonstrated to improve athletic performance when supplemented and is also related to caloric use.

Vitamin B6 (Pyridocine) – Vitamin B6, like Thiamine, has been shown to increase athletic performance and be more necessary the more exertion is involved. It's used in muscle growth and carbohydrate metabolism and is another more popular supplement. It's also important for being directly linked to protein intake – the more you eat the more need, so if you're a bodybuilder you'll need a hell of a lot.

Vitamin C (Ascorbic Acid) – Vitamin C protects against colds – making it valuable to bodybuilders who don't want to be forced to take week long breaks. It's also great for energy and blood levels of vitamin C have been shown to deplete during exercise through perspiration. Additionally it has also been shown to be another way to protect against free radicals and important in the formation of collagen which makes up the connective tissue joining muscles and bones (tendons etc).

As though that wasn't enough, vitamin C helps the absorption of iron, which binds oxygen to the haemoglobin in our blood. It also assists in the formation and release of testosterone and finally, is the most water soluble vitamin meaning it's in higher demand for

the bodies of bodybuilders whose muscles are composed largely of water. Vitamin C makes a great supplement then, particularly taken before or after a workout.

Mineral Supplements

Potassium – Potassium is an electrolyte found in muscle cells which works closely with sodium in the regulation of water levels in the body. It also plays a key part in facilitating 'action potentials' which are the signals used by nerves within the body – without which we'd have no muscle contractions. It's also involved in glycogen storage providing the muscles with extra energy. A poor sodium / potassium balance can also lead to cramping.

Copper – Copper is a trace mineral that is proving more vital to bodybuilding than previously realised. It's involved in the transport of oxygen as well as the production of noreadraneline, but is also important for increasing bloodflow during exercise. This means a bigger pump during workouts and more oxygen and nutrients being transported to them when they're needed most.

Vanadium – Vanadium is a nonelectrolyte mineral which is also available in a salt form known as vanadyl sulphate. To recap on the importance of vanadyl; vanadyl is an insulin like supplement that makes muscles harder. This it does again through increasing glycogen storing in muscles so is recommended taken alongside creatine and/or nitric oxide (for the ultimate pump...) and may also be useful in combination with copper supplementation. It may also

be useful for glycogen storage. It is the equivalent of iron for sea creatures and is responsible for the green blood of jellyfish – you learn something new everyday!

Iron – Iron is crucial in the construction of haemoglobin as we've previously discussed meaning it's highly useful for oxygen transport and so oxidative energy for the muscles. This means better ability on CV-type exercises (useful for burning off excess fat) and faster recovery between sets. It's also even more useful for women who lose large amounts of iron in their menstrual flow every month. For this reason female bodybuilders in particular might be advised to supplement with iron during this period.

Phosphorus – Phosphorus is crucial for energy in our muscles and it is the breaking of bonds in ATP (adenosine triphosphate – made of three phosphates) that supplies us with our fuel. It works better in this capacity when combined with calcium. Supplementation has additionally been shown to decrease lactic acid during workouts.

Sodium – Sodium is an electrolyte that plays an important role in the regulation of bodily fluids. It determines how much water the body retains and so can make you appear bloated. For this reason, bodybuilders might drastically limit their sodium intake pre-contest. They should not limit it too greatly as doing so will actually cause a

knee-jerk reaction meaning the body actually stores *more* water. It also plays an important role in impulse transmission and a slight 'bloat' on the muscles (which are mostly made up of the muscles) is no bad thing.

Chromium – The trace element that is chromium has many important functions – it is related to our glucose tolerance factor and helps insulin bind to its receptors. This means insulin is more efficient at transporting glucose, amino acids and fatty acids to cells making chromium important for anabolism. For this reason it is a highly popular supplement for bodybuilders.

Zinc – Zinc is important for growth and studies have demonstrated that high intensity exercise can lead to zinc loss. For this reason some athletes have low levels of zinc which is counterproductive for their gains. For this reason supplementation can be a wise move.

Calcium – Calcium is the body's most abundant mineral and for good reason. Firstly, as mentioned before it is used alongside phosphagen making it crucial for energy. Secondly, it is the mineral most involved in muscle contraction. Thirdly it is structurally important for bone and connective tissue – particularly crucial if you regularly put large amounts of stress on your body.

Monitoring calcium intake is important for bodybuilders who may avoid dairy products for their fat content. Additionally it is even more important for female bodybuilders as oestrogen can lead to decreased calcium absorption.

Magnesium – Magnesium has recently been the focus of many studies that show the benefits of its supplementation as a performance enhancer. Its use for bodybuilders is in its role in energy production and protein synthesis and in one study it was shown that magnesium supplementation lead to bodybuilders being able to exert more force through their quadriceps and other muscles. Like many vitamins and minerals it is often lost through sweat. It can be found in nuts, legumes etc which are often lacking in bodybuilders' diets.

Some Product Reviews

Hindsight is a wonderful thing that sadly always comes just as it's too late. With hindsight I now realise that a lot of the products I spent my hard earned cash on were really a waste of money and though I found some real gems along the way, I had to cut through a lot of rubbish to get there. Happily for you I'm about to share my experience with a select few reviews of products I've tried – some good, some bad, so that you don't have to go through the heartache and the walletache I did before you find some that actually do what they claim.

EAS 100% Whey Protein – EAS 100% Whey Protein was recommended to me by the instructor in my gym (incidentally that gym was LA Fitness and I would *not* write a good review about them) which is always worrying when you suspect they're getting commission. Anyway, after getting it back to mine I was pleasantly surprised. For while being cheaper than products from the likes of Maximuscle it still contained comfortingly high amounts of protein along with various other bonuses. Additionally it tasted delicious (I had the banana flavour) and lasted far longer than the guy suggested it would (he probably wanted me to buy a bigger tub). There was also no bloat (the horrible gassy feeling you can get after downing your protein) and it mixed with the milk or water with ease.

Anyway, the proof is in the pudding as they say (almost ironic in the case of protein shakes) and while taking EAS 100% Whey I actually grew more than I have during any other period of my training. It was over a year ago now but I have not since returned to the size I was back then. So highly recommended. Verdict: A highly recommended product - good value while still remaining fairly A-list.

Cytosport Muscle Milk – Cytosport Muscle Milk was the product I tried immediately after EAS. Again it was advised to me by someone earning commission, this time an incredibly overzealous checkout assistant at a shop called Naked Nutrition. She has tried to push some absolute junk on me in the past, but on this occasion the Muscle Milk was a fairly good purchase. While it was normally out of my price range it was currently on discount and looked promising.

The taste was amazing, it mixed well and they had a far more varied selection of flavours than you'd normally find (these include chocolate chip, cinnamon bun, brownie batter, chocolate malt and creme brulee!). It has many touted benefits on top of those you'd expect from a protein shake– including energy benefits from added creatine (which I advise against combining with protein but hey ho), colostrum and other ingredients found in breast milk, and fat burning properties from 'lean lipids' and 'transfats', but I found

most of this to be useless and geared more towards marketing rather than genuine usefulness. As a protein shake however it's in the upper echelons though not as good as others such as EAS and you'll be paying extra for the other 'benefits'. Get it if it's on offer or you fancy something that tastes a bit different for a change. Verdict: Good, but slightly expensive for what it is. Paying for things you don't need in a protein shake.

Prolab Pure Whey – Prolab Pure Whey is a cheapy supplement that doesn't really cut the mustard. Unfortunately it mixes terribly, has less protein than its competitors and tastes baaaad. Verdict: Not recommended.

Solgar Whey To Go – Whey to go is useful for its portability and is useful in this capacity (and can also be added to your cooking). It also contains free-form L-Glutamine and free-form Branched Chain Amino Acids (BCAA's). Unfortunately it also tastes baaaad. Other options for portable protein are the protein balls you can get, bars from makes such as Weider or Instone's puddings. However you'll pay more for any portable source as you'll buy them in smaller quantities. Verdict: Not bad as a transportable protein source.

Body Fortress Weight Gainer – Body Fortress Weight Gainer was my first ever supplement which I bought before I knew anything

about the science behind supplementation. So much was this the case that I didn't know the difference between weight gainer and protein shake. Body Fortress tasted great and didn't cost too much, but as I've said there's fairly little point for bodybuilders in paying extra for their calories. Verdict: A good, cheap weight gainer... but why would you need one at all?

Body Fortress Whey Protein – Body Fortress Whey protein is a more than adequate budget protein shake that also tastes great. Some complain that it's high in sugar and calories, but if you're not too concerned with that it won't be a problem (personally I do enough CV and have a good enough metabolism not to worry). Body Fortress is everywhere thanks to its support by Holland and Barratt's and for the price you can't go far wrong. Verdict: Cheap and cheerful.

Tribex – Tribex is a testosterone enhancer from Biotest made from tribulus terrestris and avena sativa among other ingredients. When I was on this one I didn't experience any muscle growth and many reviews have said that such products are a waste of money unless you have a deficiency or are above forty – as most younger men already produce optimal amounts. However, that said, I did find that my mood, confidence and energy were greatly improved with this product. I'm not sure what it was, but I honestly felt incredibly

'powerful' and had many egotistical dreams of running for president or flying around as Superman. This probably also meant more energy and motivation in the gym which lead me to the decision that it was a worthwhile purchase regardless of whether it had benefits for muscle growth. I'd definitely recommend it to anyone with a deficiency or even as a mood enhancer. Verdict: Good, though perhaps not for what it's advertised as.

Prolab Creatine Monohydrate – Prolab's Creatine Monohydrate is a great supplement that gave me noticeable extra energy in the gym as well as the slight 'bloat' on the muscles that gave me an extra half an inch within a couple of weeks of taking it. Prolab creatine monohydrate is a cheap supplement and where the money has been saved is clearly in the taste and mixability. It says on the front that it's tasteless and mixes easily but that's just a lie... Verdict: A great little Creatine supplement.

Prolab Caffeine Tablets – Prolab's caffeine tablets definitely work, but perhaps too well. As a caffeine addict myself, even I got a bout of the shakes the first time I had one. They're supposed to contain no more caffeine than a cup of coffee but they certainly give you more of an energy kick. This is great if you're cramming for exams (as I was) and can also be useful for weight loss and for energy in the gym.

The problem is they're perhaps *too* efficient and for me resulted in difficulty sleeping that resulted in almost dependency as I'd need more in the morning to make up for my lack of sleep during the night. They also gave me headaches (and the feeling of 'dry eyes'... though that might just be me) and if I had them before the gym my heart would pound in my chest. So maybe keep them on hand, but reserve for extreme circumstances and certainly don't use them for energy in the gym. Verdict: Powerful but not recommended for regular use.

Ener-G Shot – Ener-G shot is just one of many various energy drinks that you can get for the gym. Personally I haven't found any of these to be particularly useful, partly because downing so much of an often fizzy and extremely sweet drink right before a workout can leave you feeling gassy and bloated – even if you have extra energy you won't be able to use it if you can feel it sloshing around in your stomach half an hour later. Furthermore I experienced no benefits that couldn't be put down a placebo affect and certainly nothing substantially better than a banana or some pasta an hour before. It's also rather expensive as you tend to buy them in shots or bottles meaning you need to purchase lots.

Berocca – Berocca is a fantastic supplement that includes a great selection of minerals and vitamins including: vitamin C, thiamine, riboflavin, niacin, vitamin B6, folacin, vitamin B12, biotin, pantothenic acid, calcium, magnesium and zinc – all of which have great benefits for bodybuilders and for everyone else. It's also a great energy boost that will really refresh and energise you in a highly natural way. In the wild we'd have survived on mostly fruits, vegetables, nuts and berries with protein coming in second and behind that. For this reason we often don't get the vitamins or minerals we require and as I've mentioned we also lose them through perspiration when we exercise regularly. Meaning we need them even more as bodybuilders.

The only bad news? Berocca tastes pretty rough, and you have to dissolve them in a glass of water or drink so it's quite a punishment to drink the whole thing.

Verdict: Great and worth the slightly bad taste.

Precision Engineered Tribulus Terrestris – As I mentioned earlier, for someone like me testosterone supplementation isn't worth splashing out on. After enjoying the psychological and energy benefits of Tribex however I thought I'd try a cheaper alternative and purchase the main ingredient from that. For me though Tribulus

Terrestris has had no noticeable effects. So sadly I cannot advise a purchase on its own. Verdict: No noticeable effects.

PN GABA-1500 – My experiences of PN GABA-1500 were not pleasant. Possibly not because of the brand, but because of the supplement itself which made me feel lethargic and uninterested. It ruined my energy in the gym and also my mood and I wasn't too thrilled about tampering with my brain chemistry. I'm not sure how good PN is when compared to other brands, but I can report that the 'tingling' feeling that so many people report wasn't there suggesting that maybe it wasn't particularly potent. It was also from e-bay – illegally (though I wasn't aware at the time) - with no ingredients listed, so quite dodgy and I probably shouldn't have taken it myself. Steer clear. Verdict: Don't use GABA.

Example of a Good Stack

Before I present my recommended stack, let me start with a reckless sweeping statement by stating that you don't *need* any supplements. Even when trying to build large amounts of muscle, it's perfectly sufficient to make do with a full and varied diet and a good amount of exercise. The below will help you get more from your workouts, but that doesn't mean you can't make great gains without them. I also recommend that you consider something along these lines once you're *already* fairly pleased with your physique. Think of them as an aid, not as a solution.

With that in mind then, below is an example of a stack that I've used and had great success with. Using the following supplements combined I've felt my muscles flow with extra blood and nutrients, felt more powerful and confident, and seen my muscles grow quicker than ever before. Notice how no brand names or even product names are mentioned – instead think about it in terms of individual chemicals, proteins, vitamins and minerals. Think like a scientist and your body as a lab and don't be a slave to marketing or branding. You may be able to find many of these ingredients in just one product which is fine and may save money or include extra useful benefits that you hadn't considered yourself.

The emphasis then should definitely be on the specifics of what's going into your system and if you can't find what you need in a supplement then look around and buy the ingredient directly. This should also help you to ensure you keep track of exactly what's in each product and what works and what doesn't (see monitoring your stack).

A great bodybuilding stack:

For muscle building: whey protein taken with extra amino acids (to build up all 22 and with extra glutamine).

For muscle energy and pump: creatine monohydrate, lipoic acid, pyruvate, vanadyl sulphate and NO₂.

For testosterone: tribulus terrestris, DHEA, 6-OXO, ZMA and tongkat ali.

For health: vitamin C, thiamine, riboflavin, niacin, vitamin B6, folacin, vitamin B12, biotin, pantothenic acid, calcium, magnesium and zinc.

Monitoring Your Stack

With so many chemicals going into your body and affecting your performance it's important to pay close attention to what exactly you're consuming and whether or not it's working. For this reason it can be helpful to keep a 'diary' of sorts monitoring exactly what you're taking and what your results are. This is also useful as a way of reminding yourself what you've taken each day and what you have left to take. Overdosing can be serious with some supplements and missing them can set you back, stifle progress and waste money. For a successful diary, remember to also include your exact workouts and your diet which can both be confounding factors – for example if you take a new supplement that seems as though it's working it might just be that you've also altered your diet. Doing this will also help the rest of your training – you should really be keeping a diary of your diet and exercise already.

Now occasionally try swapping items of your stack. Try changing the brands, introducing new supplements and then monitoring your gains/losses but also look out for how you generally feel in yourself and how much you're spending. While it may be tempting to stick with a stack you've found that works; you might well be missing out on a better product that could bring you better gains. At the same time you may find that what worked for

you once no longer does and vice versa as your own body chemistry changes with age or adapts to the supplementation. For example you may find that you add testosterone enhancers later as you get older. You may find that you naturally have lots of energy and so feel no need to supplement it, or on the other hand that you have the energy of a Sloth and need all the help you can get. Remember, different supplements work differently for different people and at different times. The stack above is one that should lead to great gains for most people, but at the same time there will be other stacks that work better for other people. It's not an exact science which is why *you* need to be scientific about it to see the best gains.

A Note on Steroids

Unfortunately, a book on bodybuilding supplements would not be complete without a section on steroids. So rife has bodybuilding become with steroids, that you can bet almost any professional bodybuilder (who doesn't specifically state themselves as 'natural') is using them. Though the IFBB (International Bodybuilding Federation) technically doesn't allow steroid use, their regulations and policies are so flexible that it seems they were designed purposefully to allow bodybuilders to get away with using whatever they want – bigger muscle means more money.

For this reason you may find it tempting to do the same, so it's important that you understand the dangers, surrounding issues and potential benefits before making an informed decision.

Steroids (aka *deep breath* Gym Candy, Pumpers, Stackers, A's, Anabolics, Arnolds, Bolins, GHB, Oxys, Anabols, Balls, Bulls, Delatestryl, Maxibolin, Weight Trainers, Arnies, Dep-testosterone, Methyltestosterone, Roids or Juice), are essentially 'synthetic', meaning fake, hormones. While supplements such as tribulus terrestris attempt to stimulate and increase our natural production of a hormone and others add to our body's stores of natural

chemicals – steroids are actually *synthetic* man-made replacements which is the key difference.

Firstly you should realise that as well as harming yourself, when you take steroids you're also harming the sport of bodybuilding. If you're considering steroids yourself it's probably because you feel pressured to by successful bodybuilders who do. It might seem as though the only way you can be as successful is to use the same 'junk' as they do. If you do the same it will only exacerbate this problem for future generations and put other potential bodybuilders completely. If steroids stay so common in the sport then it will never become mainstream and will always remain a fringe sport – the territory of weirdoes and obsessives.

Steroids also support the current trend in bodybuilding towards gigantic physiques that pay little regard to symmetry or detail. The days when a small guy like Frank Zane are gone as champions such as Jay Cutler and Ronnie Coleman rain supreme. For most people this kind of look is not attractive, especially coupled with the 'GH Gut' that comes from using steroids (the little belly that bodybuilders like Ronnie have). It's also unhealthy and makes the bodybuilder cumbersome and heavy rather than athletic and powerful. This furthers the perception of bodybuilding as being the reserve of freak shows, as opposed to the time when bodybuilders

looked like a statue carved by Michelangelo. Bodybuilding is begging for a new Frank Zane, someone so ripped and athletic that the judges stand up and take notice and start returning to traditional values. There was a time when bodybuilders had the kinds of physiques you might actually find attractive and looked like superheroes rather than gorillas - they don't call it the 'Golden Age' of bodybuilding for nothing.

Some articles and books will tell you that you could win Mr Olympia with no steroids at all. I'm going to be honest and tell you right now that that just isn't true. Steroids *do* give you gains that you couldn't achieve otherwise and they will maximise your training in ways that no other supplement can. However at the same time you can still achieve extraordinary results without using steroids and there are many competitions for natural bodybuilders that have far stricter regulations and testing policies.

Using steroids also takes away some of the sense of achievement and victory you'll feel as you slowly progress. It's no longer just you whose achieved you gains, but also an illegal substance that you've injected into your body to do some of the hard work for you. Of course you could say the same for any supplement (and indeed some bodybuilders swear off putting anything foreign into their mouths at all). However it's important to

remember that most supplements either stimulate your body to produce more of something naturally (such as tribulus terrestris) or simply add to chemicals *already found* in your body (such as creatine). Many of these also come from natural sources such as plants or foods and so are already in our diets anyway. Steroids on the other hand are manufactured *synthetic* hormones that replace chemicals that should be in your body already. There's a marked difference.

More importantly steroids have many side effects and yes can eventually cause death. These side effects are unpleasant (for both you and those around you) and numerous. They are:

- Acne and bad skin
- Fluid retention
- Jaundice (yellow tinge to eyes and skin)
- Mood swings and depression
- Aggressive behaviour – or 'roid rage'
- Premature balding
- Shrunken testicles
- Heart problems

Additionally you will also be injecting yourself daily which will leave you with nasty scars down your arms (kind of detracting from the aesthetic value of bodybuilding). Injecting yourself can also be

dangerous and if you do it wrong you can do severe damage – even cause death if you get an air bubble in the needle for example or AIDS if you fail to clean the needle properly. You'll also be regularly going through pain and dealing with blood.

More importantly however, as steroids are illegal, you'll be trusting the word of your supplier that they are giving you what they say they are. Just as recreational drugs are often 'padded out' with rubbish like horse tranquilisers, so too are steroids faked and cheated. There's no governing body and no one checking the standards or quality of the products. Then there's the fact that you'll have to do your dealings under the table, hiding your products from the law and probably from many of those closest to. Acting strangely, keeping secrets from your loved ones, and sneaking away to inject yourself at regular intervals. It's not glamorous and hardly seems worth the effort. It's a slippery slope that could lead to more and more extreme lengths that can push your family and friends away. In my opinion, once you turn to steroids you've become too obsessed with your training – you're starting to experience body dysmorphia (pretty much the equivalent of anorexia for men, the most famous sufferer being Michael Jackson) and it's probably best that you take a break and reassess your

values. Remember – building muscle is above all supposed to be *healthy*.

Still, it's your body and it's up to you what you do so I've provided a list of a few steroids and their uses in bodybuilding.

List of Steroids and Illegal Supplements

Aminoglutethimide - An anabolic steroid that inhibits the conversion of androgens into oestrogens. It's also purported to have 'anti-catabolic' effects meaning you won't be burning off your muscle through excessive CV (surely this also means you won't be burning off your fat either though...).

Clenbuterol - A drug used by some bodybuilders to decrease bodyfat. A 'selective beta-2-agonist'... glad to help.

Dromostanolone - Dromostanolone is another anabolic/androgenic steroid injected for muscle gain.

Formyldienolone - Injectable anabolic steroid that's also used for 'site location', where you inject the specific muscle you want to grow meaning you can precisely target your muscle development. This also leads to injection marks all over your body however and sometimes horrendously disproportionate muscle groups. There's a guy in my gym who blatantly uses site location in his triceps. He looks ridiculous.

HGH - Human Growth Hormone is responsible for recovery and growth (including muscle tissue growth) in the human body.

Produced while asleep, it can be taken as pills/injections to enhance muscle growth, reverse ageing and improve mood and cognitive ability. While this is safer than many other steroids it can however lead to enlarged organs and even mild facial disfigurement (your jaw and nose will grow from it too though only minimally).

Other types of steroids include: Anatrofin, Anaxvar, Annadrol, Bolasterone, Decadiabolin, Decadurabolin, Dehydropiandrosterone (DHEA), Delatestryl, Dianiabol, Dihydrolone, Durabolin, Dymethazine, Enoltestovis, Equipose, Gamma Hydroxybutylate, Maxibolin, Methatriol, Methyltestosterone, Parabolin, Primobolin, Quinolone, Therabolin, Trophobolene, and Winstrol.

The Future of Bodybuilding Supplements

Soon the face of bodybuilding supplementation is going to change. They're going to be so powerful that they make steroids a thing of the past, so effective that you only need to administer them *once* for *permanent* effects and so safe that *everyone* will be taking them – bodybuilder or not. In fact these supplements, or more accurately procedures, will be so powerful that they'll threaten the sport of bodybuilding making it almost redundant. Of course there's a chance that the government, or at least the IFBB (the International Federation of Bodybuilding) would ban such drugs, but even this won't stop them as they'll be completely *untraceable* and highly affordable.

Now that sounds like a nonsense campaign for a new supplement (italicised and all...) but in this case the hype is genuine though I may have mislead you somewhat. What I'm talking about here is the realm of 'transhumanism', a movement that advocates the use of new technologies to enhance the human condition. We're not talking stem cell research here – that's for people who are already sick – this is the concept of taking perfectly healthy humans then giving them treatments that will make them smarter, faster or stronger.

In some senses transhumanism already exists and in some senses bodybuilders are already 'transhuman' in their use of supplements or steroids. In some ways even plastic surgery is transhumanism. Where it becomes a real issue however is when considering the permissibility of more advanced technologies such as 'gene doping'. Gene doping is the act of changing the very DNA of a living being so that you can alter its programming and its very physical form (our DNA is what instructs the body where to send the amino acids when making repairs/growing). While this may sound like science fiction, the reality is that gene doping has already been successfully accomplished with a variety of animals including mice and dogs. Even more unbelievable is the fact that gene doping involves only a single injection, has no known side effects and can last permanently ('insertional gene doping') or for several years ('non-insertional'). And because mapping our DNA is an incredibly expensive and lengthy process (if you're incredibly vein you can have it done for several thousands pounds) there's no practical way to find out if someone's had the injection (and furthermore your DNA might have just mutated naturally and is found in the nuclei of every single cell in our body).

Of these gene doping experiments one in particular is of particular interest for bodybuilders; an injection that can

permanently increase muscle mass by up to three times the normal amount. This works by permanently blocking the body's natural production of 'myostatin', a 'growth differentiation factor', that acts as the opposite of growth factors – inhibiting the development of our muscles. With this gone, our muscle is free to grow to much larger proportions and does so even with no extra training on our part. While this has never been tested on humans it has however been demonstrated on mice and has been achieved through breeding in both whippets (resulting in 'bully whippets') and cattle (resulting in the breeds 'Belgian Blue' and 'Piedmontese'). Type one of these into Google and see the results for yourself. Even more amazingly, the mutation has also been known to occur naturally – and in humans – resulting in one German 'superchild' who was born with the mutation and far greater muscularity. Though he is still young, this real life 'X-Man' currently demonstrates no negative side effects from the condition.

The mutation can also occur (or be caused) in one of two fashions – through homozygous or heterozygous deletion (referring to whether one or both base pairs are deleted). Here homozygous deletion results in a less drastic change, though bully whippets were found to appear more muscular with homozygous deletion despite being the slower runners.

What makes things even more interesting is the possibility that many more people have the homozygous condition (including the German child's parents) and that a selection of these people are probably bodybuilders (specific accusations have been made but I won't repeat those here).

Gene doping is so simple and requires such minimal equipment that apparently anyone with a PHD in genetics or biology could probably do it. For this reason it's unlikely that we'll be able to restrict its use even if the government tries to and some scientists have predicted that we'll see it being used as soon as the 2012 Olympics. One source, that I have yet to verify, informs me that 'trials' on humans have already begun.

Predictably, supplement companies have already cottoned onto the idea too and released products that they claim can already inhibit our production of myostatin without any need for gene doping. These are known as 'myostatin binders' and generally considered useless despite the wild claims of their manufacturers. Herein lies another lesson in avoiding nonsense, that if it has wild claims but you've never heard of it, it probably doesn't work – if you were the only guy who knew about a product that could triple your muscle mass you'd tell someone right? Or at least try and make some money off the back of it yourself...

While we're not quite there yet then, soon you are going to have to decide whether you condone the use of such technologies and whether you yourself would consider using them. The reality is that you probably wouldn't stand a chance in bodybuilding competitions if you didn't, and that you'd infact be weaker than many people who didn't train at all. On the other hand, where's the challenge or the competition in taking such a 'short cut'? Would you still be you if you changed your DNA? Type 'Transhumanism Bodybuilding' in Google and read more on the subject, if you want to be ahead of the game and prepared for it when it happens.

Some Take-Home Lessons

- No supplement is essential.
- Though they can be very beneficial.
- Be careful who you listen to and don't expect to find a 'silver bullet'.
- Don't use anything unless you know exactly what has gone into it.
- Do your research.
- I strongly advise against using steroids, but if you must, then make sure you're even more careful and fully informed.
- Protein shakes and creatine are the two most useful supplements.
- Tailor your own stack to be perfectly suited for your needs and to be more effective than anything available as it is.
- Monitor your progress and keep tabs of what you take.
- Think ingredients not brands.
- Different supplements work for different people.
- Prepare for the future of bodybuilding supplements.