

### 3.2.2.3.3.6 Testosterone up-regulation, a tricky issue

There is sample of evidence that a sufficiently high testosterone level is absolutely essential to a sexualized lifestyle. Testosterone, the hormone primarily synthesized in the testicles (but not only there), is necessary both for sexual appetite and performance (e.g. achieving a good erection). Men whose testosterone levels are low will be lacking in both.

But there are oral testosterone medications. The best-known one is Andriol. Andriol is not just testosterone but testosterone undecanoate, a chemical alteration of testosterone of which a small percentage will, in most subjects, make it past the liver into the blood stream.

Animal testicles have a reputation as aphrodisiacs, but this, too, is based on an overly simplistic logic. If any, there is very limited benefit on the same level on which eating liver benefits anemic patients. Of course, iron is a major mineral in blood, and often anemia is one of iron-deficiency. Eating blood products such as liver will make available to the organism some additional iron to be used in the body's own synthesis of blood, provided it's not a disturbance to this process that is at the root of the iron-deficiency anemia in the first place.

In the US, Andriol is not a licensed medication. For the serious treatment of hypogonadism, it would just be the second-best choice anywhere in the world. It's not only that it is hard to predict how much testosterone of the 40 milligram of testosterone undecanoate each capsule supplies actually makes it into the blood stream. Estimates are 2 to 3 milligram. But there will be variations from person to person, and in a single person from day to day, depending on the diet the liver has to deal with apart from the testosterone undecanoate.

But even in subjects in whom oral testosterone medications do work, such medications are not an aphrodisiac like yohimbine. Taking for granted that testosterone undecanoate capsules do raise blood levels of free testosterone, the person taking this medication will not

feel a sexualisation an hour or so after ingesting the capsules. If raising testosterone levels does work, it seldom does so immediately. There will be a good measure of unpredictability. For men on testosterone replacement therapy (several daily doses over some time), the sexualizing effect will arrive sporadic every now and then. Why it is like this, has, to the best of my knowledge, so far not been conclusively explained.

I have mentioned that testosterone as drug is not a medication of which one would feel much within an hour or so. Unless it is hugely overdosed. And the effect of an overdose is not just a potentiation of the desired effect of a normal dose.

The desired psychological effect of a normal dose may be increased sexual appetite, a good erection that doesn't break down, and a powerful orgasm. Testosterone-deficient men will be lacking in all three. Testosterone supplementation in testosterone-deficient men will restore all three. But not in the manner that desire, performance, and orgasms will be enhanced an hour or so after popping an oral testosterone medication. It may well take a few days for the effects to set in in the first place. Increased desire may arrive rather surprisingly, not at a moment it was planned for. It's not as direct an effect as for aspirin or yohimbine.

Increased desire is also not a direct correlation to increased testosterone plasma levels. The endocrine system really is rather tricky. And anyway, increased plasma levels only peak a long time after an oral testosterone medication has been applied. For Andriol, they are supposed to occur some five hours after a dose has been ingested.

While the supplementation of regular or even high dosages will normally not be felt within hours after they have been ingested, it's a different story with huge overdoses. Use in women more than in men provides a clear indication to this end.

Of course, Andriol, as well as other testosterone products on the market, are entirely not intended for use in women. But testosterone is the hormone for sexual appetite not just in men but also in women. However, normal testosterone levels in women are much, much lower than in men.

Though not intended for the use in women, women, too, are among those taking Andriol and other testosterone medications. The objective is usually to raise performance levels in sports.

Women on steroids usually exhibit an increased sexual appetite but it's again something that sets in with constant use, not as the effect of a single dose. The most likely effect of a single overdose is extreme anger. It's something more likely to happen in overdosed women, rather than men.

Contrary to the bad reputation of testosterone in this respect, high active levels of this so-called male hormone are not associated with an anger-prone personality, but rather the other way around. High plasma-levels of testosterone will usually give men a positive outlook, make them friendly, understanding, and willing to learn. Abnormally low levels go hand-in-hand with bad moods and depression. As previously mentioned, only extreme overdoses may result in anger, even rages.

We have pointed out above that endocrine matters are rather complicated. This is the case because the endocrine system is one of multiple balances by which hormones are kept in check.

Because of this, blood testosterone levels are only an indicator of limited value if one is to judge whether there is enough testosterone activity in one's organism in order to get the best out of sex.

The bioavailability of testosterone is kept in check by a blood-stream protein called sex hormone binding protein (SHBG). Testosterone molecules that have been captured by SHBG are rendered absolutely ineffective until they are anyway discarded from the organism.

Many men who are given the advice to undergo a testosterone test, are simply fooled. These tests measure overall testosterone, both testosterone which is bound to SHBG as well as free testosterone.

These tests are useless when it comes to assess whether a man should undergo testosterone replacement therapy or not. The determining factor would be whether a man is sufficient in free, bio-available testosterone.

Compared to meaningless lab results on overall testosterone, plain logic is the smarter approach to decide on the need for testosterone replacement therapy. For all men, the process of becoming older is accompanied by a decline in the synthesis of testosterone.

But not only does the production of testosterone decline. The amount of bio-available testosterone is further reduced by the fact that older men typically "suffer" from increased levels of sex hormone binding globulin.

The decline in bio-available testosterone is largely proportional to all those other symptoms of advancing in age, such as bones becoming brittle, sacking skin, loss of lean body mass, decrease of muscle tone, obesity, and a decline in sexual desire and performance.

This all smells like a ploy of nature to get rid of older specimens of the species homo sapiens by having genetically programmed a decline in the availability of testosterone.

And indeed, there is little doubt in the scientific literature that testosterone supplementation not only works to avoid the onset of these events of aging. Testosterone supplementation has the power to reverse these developments.

Older men undergoing testosterone replacement therapy will practically always develop stronger bones and exhibit more lean body mass while carrying less fat. They will usually have a more active and satisfying sex life, though this cannot be measured as easily as lean body mass and fat.

So, why do doctors not recommend that all men from about the middle of their 40's undergo testosterone replacement therapy?

There are a number of reasons why physicians and other health care professionals have been slow in prescribing testosterone replacement therapy.

Testosterone has substantial potential as doping drug in sports. Testosterone supplementation during training periods, long before competition, will lead to increased muscle mass, an asset in many sports. It will also enhance performance during competition, which is why doping controls for testosterone are undertaken at all major events.

The tendency among those who take testosterone supplementation, or use anabolic steroids, is for huge overdoses. And these are obviously not healthy. Therefore, sports and healthcare administrations around the world have run public awareness campaigns to the effect that anabolic steroids, or hormone supplementation sports in general, pose a serious health risk. Testosterone is not really an anabolic steroid, but it's a steroid hormone with an anabolic effect (the more important component being testosterone's androgenic characteristics),

Sure, mice that are given huge overdoses of testosterone for most of their lives have shorter ones (lives, that is). But we are not talking huge overdoses here. We are talking about high, youthful levels as everyone healthy has them at the beginning of the 20's. And a good number of studies have show that testosterone supplementation to achieve such levels is no major health risk

Horror stories about dreadful deaths as a consequence of the abuse of synthetic anabolic steroids are good copy but bad science. They don't apply to testosterone supplementation with the aim to achieve youthful levels of the hormone.

Apart from the doping issue. Testosterone has long been associated with two health risk: heart attacks and prostate cancer.

Women up to the age of about 50 have a much lower heart attack risk than men, primarily, so it seems, because they are protected by estrogens. Men with reduced testosterone levels have been shown to be less prone to heart attacks than men with high levels of the male hormone. In spite of this, I for myself, am in favor of a lifestyle of a high testosterone level. But I take the scientific studies that associate high testosterone levels with heart attacks as a reminder not to expose myself to additional heart attack risks, such as smoking or obesity.

In case of a second health risk, testosterone may have been the wrong suspect for many years. Testosterone has for many years been considered the main culprit in prostate cancer. Actually, not testosterone but its more powerful metabolite dihydrotestosterone.

Testosterone is transformed by the enzyme 5-alpha-reductase into dihydrotestosterone. Actually, dihydrotestosterone is the form of testosterone, which is the major hormonal player in sex matters.

Levels of dihydrotestosterone, not testosterone itself, are what make a difference for the number of orgasms per week. Dihydrotestosterone is also the form of testosterone, which is at work in mediating erections.

And dihydrotestosterone is the form of testosterone that seems to increase the susceptibility for prostate cancer. But the truth of this assessment has already been questioned.

If one has arrived at a decision to undergo testosterone replacement therapy, one will have to decide by which means to supplement testosterone. Most people would feel most comfortable with an oral testosterone drug such as Andriol. Indeed Andriol would be the medication of choice in most countries around the world. But Andriol is not licensed in the US.

And while Andriol is convenient for the patient, there are some disadvantages, both medical and practical. Testosterone undecanoate burdens the liver, an effect that can be avoided by both testosterone injections and transdermal patches, the application of choice in the US.

A practical shortcoming of Andriol is that it has to be stored at a temperature of between 2 and 8 degree.

Though not Asian by birth, I have been living in various countries of Southeast Asia for about 20 years. In most countries here, all kinds of prescription medication are sold over the counter. No question asked, no prescription required.

Body builders and pharmaceutical addicts buy their drug supplies during trips to Bangkok for months ahead.

Too bad that in the case of Andriol capsules which they intend to use for testosterone's anabolic properties, what they buy is often enough just empty liver ballast. For while anybody can buy prescription drugs without prescription, it seems that, furthermore, almost anybody also can sell them. Not much of professional qualification seems to be required, and even if qualification is present, it seems to be lacking in the understanding that some medications ought to be stored in the refrigerator. Andriol is among them.

What you find in Southeast Asia are drugstores, many of them not even air-conditioned, where the Andriol lies in the cabinet, at 30 or more degrees, for months on end. The package still says "Andriol" but there is not much testosterone undecanoate left inside the capsules. That Andriol is often considered worthless as steroid among body builders may have its roots in the fact that body builders often will get their Andriol capsules not from an ordinary licensed pharmacy in an industrial country but on the black market or in countries like those in Southeast Asia where a prescription is not needed but appropriate storage is also not guaranteed.