2,4 Dinitrophenol (DNP)

2,4-Dinitrophenol (DNP), $C_6H_4N_2O_5$, is a cellularmetabolic poison. It uncouplesoxidative phosphorylationby carrying protonsacross the mitochondrialmembrane, leading to a rapid consumption of energy without generation of ATP. DNPwas used extensively in the 1930s in diet pills after Cutting and Tainter at Stanford University made their first report on the drug's ability to greatly increase metabolic rate. DNP acts as a protonophore in themitochondrial membrane, uncoupling oxidative phosphorylation and making ATP energy production less efficient. In effect, part of the energy that is normally produced from cellular respiration is wasted as heat. This inefficiency is proportional to the dose of DNP that is taken. Thus, as the dose increases and energy production is made less efficient, the metabolic rate is increased (and more fat is burned) in order to compensate for the inefficiency and meet energy demands. Interestingly, the factor that limits ever increasing doses of DNP is not a lack of ATP energy production, but rather an excessive rise in body temperature due to the heat produced during uncoupling. Accordingly, DNP overdose will cause a fatal fever. Case reports have shown that an acute administration of 20-50 mg/kg in humans can be lethal. Concerns about dangerous side-effects and rapidly developing cataracts resulted in DNP being discontinued in the United States by the end of 1938. DNP, however, continues to be used by some bodybuilders and athletes to rapidly lose body fat. Fatal overdoses are rare, but are still reported on occasion. These include cases of accidental exposure, suicide, and excessive intentional exposure.

Some advocates of the drug advise people to take doses of 5-8 mg/kg daily. It's commonly advised, however, that the dose be slowly titrated according to personal tolerance, which varies greatly.

There is limited and conflicting data on the pharmacokinetics of DNP in humans. The EPA states that "Data on the elimination kinetics of the dinitrophenolsor their metabolic products in humans were not found." The ATSDR's Toxicological Profile for Dinitrophenols also states that "No studies were located regarding distribution in humans after oral exposure to 2,4-DNP. Limited information is available regarding distribution in animals after oral exposure to 2,4-DNP." However, they do state that "Elimination from the body appears to be rapid, except possibly in cases of compromised liver function." This coincides with a review in the NEJM on the biological actions of dinitrophenol, which stated that "Judging from the metabolic response, DNP appears to be eliminated entirely in three or four days in the presence of liver or kidney damage it is possible that the drug will be retained over a longer period." Oddly, more recent papers give an array of possible half-lives, ranging from 3 hours, to 5-14 days. Other recent papers maintain that the half-life in humans is unknown.

In a study on mice, a lethal dose of 35 mg/kg decreased to 5 mg/kg body weight when the environmental temperature was raised to 39°C (102.2°F). As the ambient temperature increases, so does the risk of overheating. People who use increased ambient temperatures for weight-loss, such as wrestlers and runners, are potentially at greater risk of overdose.

Although further investigation is needed, dinitrophenol-induced hyperthermia has been successfully resolved with dantrolene administration. "Dinitrophenol uncouples oxidative phosphorylation, causes release of calcium from mitochondrial stores and prevents calcium re-uptake. This leads to free intracellular calcium and causes muscle contraction and hyperthermia. Dantrolene inhibits calcium release from the sarcoplasmic reticulum which reduces intracellular calcium. The resulting muscle relaxation allows heat dissipation. There is little risk to dantrolene administration. Since dantrolene may be effective in reducing hyperthermia caused by agents that inhibit oxidative phosphorylation, early administration may improve outcome."

While DNP itself is considered by many to be too risky for human use, its mechanism of action remains under investigation as a potential approach for treating obesity. Currently, research is being conducted on uncoupling proteins naturally found in humans.

DNP in Bodybuilding

DNP was first introduced to the bodybuilding world by Dan Duchaine. In the late 90s, the body building magazine Muscle Media 2000 was offering this special deal to anyone who subscribed to their magazine. If you subscribed, you got a bunch of audio cassettes containing interviews with 10 bodybuilding experts. Those cassettes included interviews with noted bodybuilding experts, and I am sure they were very interesting. I only listened to two of them, and the other eight collected dust in a drawer somewhere in my bedroom, I am sure. But one of the two I listened to had an interview with Dan Duchaine on it, which ended with him promising to tell the bodybuilding world about a new substance which would revolutionize the bodybuilding world. Fast forward a year, and there was a question in MM2K asking him to let the cat out of the bag.

What he did was tell us about DNP. Since then, we have a lot more experience with it, due to feedback from bodybuilders who have used it, and figured out the optimal doses and such from trial and error. The first thing that I will tell you about DNP is the first thing Mr. Duchaine said about it.

Using DNP & Reducing side effects

Using DNP , even under strict regimens to help reduce the negative side effects is not just as easy as "using" the steroid. There are other considerations as well. First of all, it's important to keep carbohydrate intake up. Since people who have used DNP report craving carbs, this shouldn't be too difficult. The body on DNP burns carbs quickly, so eating them after workouts is a good idea. Additionally, water intake should be up to around two gallons per day. That, along with a multivitamin and energy supplements will help lower the risk of side effects.

DNP Weight Loss

All of this tells me that your body will need to create more energy than usual to keep up with the demands DNP is placing on it. In addition, it will have to use more of the food you take in to produce that much-needed energy, and less of that food to create and store fat. In fact, you will start using stored fat as energy to attenuate the energy deficit DNP creates. I have seen studies on animals where a +60% increase in metabolic rate is achieved with DNP use, although I feel that in humans, the rate may actually be higher. My speculation is that proper DNP use in humans can net a 40-80% rise in BMR (basal metabolic rate). This is all from hyper metabolism, or the increase in metabolism or your body & euro ™s need to use more energy to perform tasks.

So what happens when your body requires more energy to do today the same things it did yesterday? You lose more fat today than you did yesterday. In this case, a lot more. What else? You get tired more quickly as your body struggles to convert food into energy. Your endurance will suffer. Your staying power in the last few reps of a set will vanish. Your ability to complete the same amount of sets as you did yesterday, with the same intensity and weights will suffer. But that will not seem like much of a big deal to you at the time, because you probably will not get much of a "pump" at all from the workouts you are completing because DNP reduces the amount of available glycogen in your muscles. DNP will also increase your rate of ventilation, as your lungs try to get oxygen into your muscles. Y our blood will be moving a bit slower than usual, as DNP will increase the viscosity (thickness) of it. Basically, it will increase your bodys need for oxygen as well as your blood viscosity, and it nearly doubles the rate of oxygen consumption in muscles. Thus, your body will have to work much harder to oxygenate your blood, and then transport it to working muscles. Cardiac output will then increase proportion to this new rate of oxygen consumption. If you are an athlete, you will play like garbage on DNP because of all that stuff I just mentioned. For these reasons, I see it as very useful for a bodybuilder (who only has aesthetics to be worried about, not functional ability or performance), but not very useful for an athlete. If (and this is a big if), you are badly out of shape and fat before you have training camp for your sport & euro ™s preseason, then I suppose you can try to use this stuff to lose some fast weight. But in all honesty, a 20 day cycle of DNP, no less than a month away from training camp is all I would risk. You will lose some weight, and only have to keep it off for a month until training camp starts. I really want to stress, though, that this stuff is an exceptionally poor choice for use by an athlete. And remember that part I told you about earlier, about DNP inhibiting muscle contraction? Yeah, that will make you weaker, also.

DNP: The Secret Weapon to Burn Fat

If you are seeking to shed body fat very quickly, DNP is what you're looking for. Be warned - DNP is very powerful and can be deadly when abused. However, if you're facing a situation where getting in shape for a show (when you're behing) is absolutely essential, DNP is an option.

The good news is that very few bodybuilders have died from DNP use. The scare tactics do exist for a reason, however. Many people have gotten very sick from DNP. Additionally, there are probably many cases of bodybuilders who have quietly passed away, or at the very least quietly suffered some serious side effects and recovered or retired, thanks to the use of DNP.

DNP is a yellow chemical used to make dyes. Simply put, it works in bodybuilders by elevating the metabolism - and raising the body's temperature by a few degrees. You know how you feel when you have a fever - sweating, chills, and constant discomfort? Welcome to a normal day in the life of a DNP user. On the plus side, however, you know how lean you look when you get over the flu? That will happen as well!

DNA works to deplete ATP from your cells, which causes the body to replace this energy with food (or stored body fat). In other words, the cells consume at a much higher pace than normal. How much? Take a deep breath. DNP can raise the metabolism by 40 to 80%. Yes, you heard right. If you are able to burn 2000 calories per day normally, you will now burn through 2800 to 3600 calories per day. Your body will be a furnace. You will be sweating yellow the whole time, however.

You will become weaker on DNP, so be prepared for that. Your lifts will suffer and you will feel depleted. You'll be able to consume more calories on your diet than you did off of it! However, you will need these calories to meet the new metabolic rate of your system. Many bodybuilders report they lose about one pound of body fat - per day - using DNP. Larger bodybuilders can lose even more. There are no real known dangers to the heart, liver, or blood pressure levels when using DNP.

Now that you've been able to savor the terrific fat-burning effects of DNP, let's check out the negatives. You will sweat profusely. It will have a yellow tint. You will have an odd odor, of chemicals. You will taste metal much of the day. If you use too much DNP, you run the risk of permanently altering your thyroid function. Additionally, it can lead to blindness. As you can see, it's not something to take lightly.

You take one 200 mg pill per day, and then you sit back and watch the body fat disappear. If you feel any serious illness or side effects, or your temperature goes above a sustained 101 degrees, it is definitely time to accept the fact that your body wasn't made to handle DNP and you need to see a doctor!

DNP is Dangerous

If you use DNP wrong, you may go blind, or end up in the hospital on an ice bed receiving ice-water enemas as the doctors frantically try to make the temperature of your yellow and sweaty body go back down. This is not a JOKE. On the positive side, very few people have died from DNP use, although it remains a distinct possibility, as some DNP related fatalities have been reported. Outside the Bodybuilding world, DNP is used to make certain dyes, break open a capsule of it and you will see that the distinct color you get on your hands is nearly impossible to wash off. It can also be used as a fungicide, herbicide, and insecticide. Before that, in the early part of the 1900s it was used as an explosive. Clearly, this is stuff you do not want to take lightly. DNP works by uncoupling oxidative phosphorylation, which increases the bodys temperature and metabolic rate. Synthesis of fatty acid in adipose tissue requires cooperation of mitochondrial and cytoplasmic enzymes. Mitochondria release energy from food molecules and transform energy into useable form via the production of ATP. ATP is the primary carrier of energy within your cells, and most cells die quickly in the absence of it. ATP in turn powers your muscles. What does DNP have to do with all this? DNP depletes your muscles ATP, thus requiring your mitochondria to convert more energy from food molecules, and thus create more ATP to replace what was lost. This makes your body use more energy to do anything from walking the dog to benching 315lbs. In addition, since cellular levels of all these metabolites depend on the efficiency of mitochondrial energy conversion, a mitochondrial proton leak via uncoupling proteins (UCPs) could modulate Fatty Acid synthesis. Paradoxically, DNP inhibits muscle contraction, even though it accelerates the ATPase activity of isolated myosin. ATPase is the enzyme that causes ATP molecules to release the energy they store, and myosin is a protein that (along with actin) is responsible for both muscular contraction and relaxation.