

*THE LITTLE GUIDE ON
DIETARY SUPPLEMENTS*

CREATINE

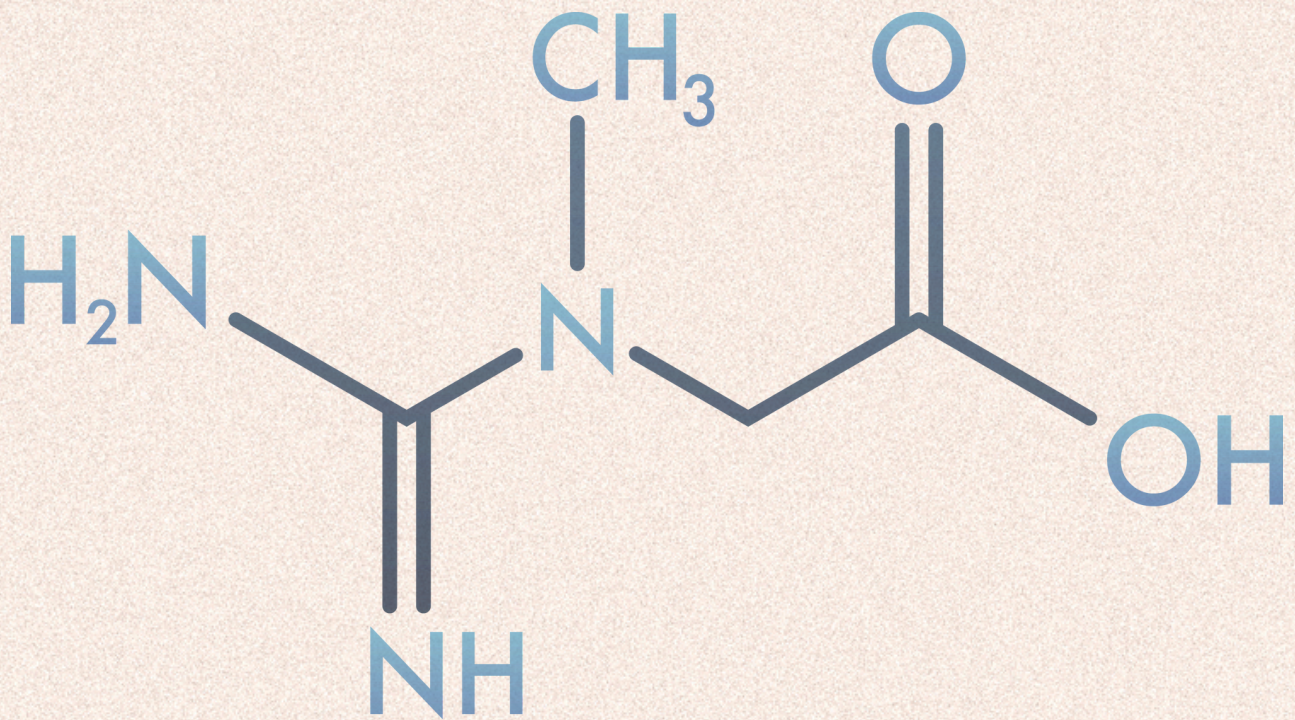


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A WORD

Creatine (monohydrate) is a dietary supplement that has been tested time and time again for the last 30 years, it has multiple benefits and is, on the internet, recommended by pretty much everyone who has an opinion, but should *you* actually supplement yourself in creatine? Maybe yes, maybe not.

Creatine supplementation makes sense if you're someone who doesn't eat a lot of any meat or fish. If you train regularly, at medium to high intensity that requires a good level of recovery, and a lot of muscle. It also makes sense if you're tired often, if your body struggles to maintain a healthy amount of muscle mass, if your body is prone to inflammation, difficult menstruations or even if you're trying to procreate.

In my experience this description fits quite a large portion of the population, which is why I would say that indeed, most of us could benefit from supplementing in creatine. But before taking that step, **everyone should first look at their level of physical activity and food intake for 2 reasons:**

1. **Supplements don't fix a bad diet**, if you purposely avoid animal-protein (like vegetarians and vegans do) you know that you have things to compensate for, but if you lack certain nutrients out of unawareness then analysing your nutritional habits and improving them should be a priority. Nutritional deficits related to medication or specific conditions get a free pass, there are some things that are just out of our control and sometimes supplement can be a powerful help.
2. **Creatine won't be as efficient if it's not paired with physical activity.** As you'll see in the next pages creatine acts on energy metabolism and energy metabolism is directly linked to the use of our body. While you don't have to be a sprint athlete to benefit from creatine, it would be even more beneficial if you used your muscles, brain and heart a little more or a little better than what you are used to. Wherever you're at now and whatever your age, try to challenge yourself (within reason) and if you're already doing it then keep going.

I hope that this document will give you the tools to understand what is creatine and how it actually works, that you'll appreciate its benefits that go way beyond training performance and that you'll gain the confidence to decide for yourself whether or not you should increase your intake as well as how to do it.

1. A BIT OF PHYSIOLOGY

SOURCES & DAILY NEEDS

Creatine is a naturally occurring non-protein amino acid compound from the guanidine phosphagen family (a group of compounds linked to energy production). The form that we consume through our diet and produce ourselves is usually simply referred to as *creatine* while synthetic supplements have their own little name (like Creatine Monohydrate, Creatine Pyruvate or Buffered Creatine).



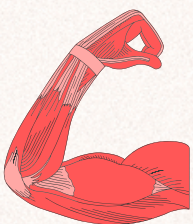
About half of our daily needs are covered by *endogenous* (made in the body) creatine synthesis from arginine, glycine and methionine, three amino acids that we obtain from dietary proteins. This creatine is produced in the kidneys, pancreas and liver.



The other half is called *exogenous* (coming from outside of the body) and is completed by our daily food intake, particularly from red meat and fish. We ingest and store this creatine as it is.



On average our body synthesises around 1-1,5g of creatine every day, the remaining 1-2g need to be consumed through food (or supplementation). During supplementation, this endogenous production is reduced, meaning that the body reduces the amount of creatine it synthesises from amino acids. Things go back to baseline after the supplementation is discontinued.



95% of the creatine in the body is stored in skeletal muscles (also simply called “muscles”), the 5% left is found in the brain, heart, and testes. In the muscles, $\frac{2}{3}$ of creatine is bound to inorganic phosphate and stored as phosphocreatine (PCr), while the remaining $\frac{1}{3}$ is stored as free creatine.

2. CREATINE & ENERGY PRODUCTION

Human energy production is based on interconnected pathways that break down nutrients digested from foods into usable energy called adenosine triphosphate (ATP). ATP is composed of one molecule of adenosine and three phosphate groups and is nicknamed the body's "energy currency". Our muscle tissues can only store a very small amount of it.

THE ATP-PCr SYSTEM

During sudden, brief, and powerful movements lasting less than 10 seconds our body relies on the phosphagen system, also called ATP-PCr system (adenosine triphosphate - phosphocreatine system). This system is anaerobic (no oxygen is used).

Imagine having to sprint after a bus:

1. During the first 2-3 seconds of movement, our stored ATP is broken down to produce energy, it's divided into a molecule of adenosine *diphosphate* (2 phosphates instead of 3) and a molecule of inorganic phosphate (the 3rd phosphate just floating around).
2. We have a very small amount of ATP stored in the muscles, so to keep sprinting our body needs to constantly re-produce more ATP. This is done by the action of the *enzyme creatine kinase* that divides our *phosphocreatine* (PCr - the creatine stored in our muscles) into separate molecules of creatine and phosphate. This break down itself produces energy.
3. This energy is used to fuel to resynthesis of ADP into ATP by linking the newly available phosphate molecule to the awaiting adenosine diphosphate.
4. This fresh ATP molecule can then be used to generate new energy for muscle contraction.
5. As the sprint continues, the cycle starts all over again, the used ATP becomes ADP, PCr is broken down into creatine and phosphate, and energy is released, fuelling our skeletal muscles (legs) and cardiovascular muscles (heart and lungs) as well as the rest of the body, and ideally helping us reach our bus.

If you'd like a visual representation of this process, here's a very old but good [video](#).



What if we need to keep on running?

If after 10 seconds we haven't reached the bus, the explosive ATP-PCr system won't be able to keep up. Our energy production and pace will slow down and other systems will take over:

- **first the anaerobic/lactic acid system** will synthesise more ATP from glycogen, this synthesis will create lactic acid as a byproduct,
- as the muscles fatigue even more, we will slow down again and **the aerobic system becomes predominant**. The bus is probably long gone but if you're used to endurance running you might make it to your destination anyways.



WHAT IT MEANS WHEN YOU'RE TRAINING

As we've seen the energy system that relies on creatine is the one we can only use for the shortest time. So for medium to low intensity endurance training (like a mid-pace run or a chill bike tour) your body won't be draining its creatine stores, instead it will reach for much more available resources like oxygen, glycogen and/or fatty acids.

For more intense types of training, being able to produce more ATP (energy), has the cool effects of increasing:

- maximal strength (low speed strength, like a heavy squat),
- maximal work output,
- power production (high speed strength, like a high jump),
- sprint performance,
- muscle mass and strength adaptation,
- fat-free mass,
- recovery,
- work capacity and training tolerance.

Basically your body has more fuel to do all its different physiological processes at once which increases both the spread and the outcomes of your training.

The increase of creatine in the muscles also allows for more intracellular water which in turn can increase the storage of glycogen and protein synthesis. **More glycogen and protein synthesis can enhance the action of the other energy systems (the anaerobic & aerobic systems), positively snowballing on lower intensity activities too.**

Here's a little overview on how creatine may affect various physical activities :

Physiological effects	Physical & daily activities	
Increased phosphocreatine (PCr) in the muscle (direct ATP production)	<ul style="list-style-type: none"> • track sprints, • swim sprints, • pursuit cycling, 	<ul style="list-style-type: none"> • sprinting after a bus, • cycling uphill
Increased phosphocreatine (PCr) resynthesis (more endurant energy turnover)	<ul style="list-style-type: none"> • basketball, • hockey, volleyball, • swimming, 	<ul style="list-style-type: none"> • uphill hiking, • dancers, aerialists, • stage performers
Reduced lactic acidosis (less burns and cramps)	<ul style="list-style-type: none"> • downhill skiing, • rowing, paddling, • 100-200 swims, 	<ul style="list-style-type: none"> • combat sports, • 400-800m track, • aerialists
Oxydative metabolism (creation of ATP with oxygen)	<ul style="list-style-type: none"> • basketball, volleyball, • football, tennis, • dancers, performers, 	<ul style="list-style-type: none"> • endurance interval training, • leisure hiking
Increased body mass/muscle mass (induced by more efficient/intense training)	<ul style="list-style-type: none"> • rugby, Am. football, • bodybuilding, • combat sports, 	<ul style="list-style-type: none"> • powerlifting, • track/field events, • Olympic weightlifting

3. OTHER HEALTH BENEFITS

HEART HEALTH & ANTIOXIDANT PROPERTIES

- Creatine helps with intra-training fatigue and may reduce the symptoms of training-induced muscle damage (soreness). **Outside of physical activities, optimal levels of muscular creatine have positive effects on rehabilitation, chronic inflammations and slowing down muscle dystrophy. This can be especially interesting in the treatment of osteoarthritis and fibromyalgia.**
- Creatine also promotes vasodilatation that could lead to improved blood flow and reduced vascular resistance, **its antioxidant properties also act on cardiovascular tissues, potentially benefiting individuals with hypertension, and reducing risks of heart diseases and stroke-related damages.**

If you look at your last blood test, you might find results for the *creatine kinase* (CK), the enzyme that helps with ATP production. The amount of CK in the tissues is typically higher in people who train often and/or at high intensity (because of muscle damage), it can also be a side effect of certain medications. In a blood test, CK levels are used to assess levels of stress/inflammation in the body and/or specific areas:

- CPK-1 (or CPK-BB) is mainly found in the brain and lungs,
- CPK-2 (or CPK-MB) is found in the heart,
- CPK-3 (or CPK-MM) is found in the muscles.

GLYCEMIC CONTROL

- Physical activity is recognised as an efficient method to improve glucose metabolism (use of glucose), insulin sensitivity (production of insulin to regulate glucose), increased glycogen content (glucose in the muscle that is used for energy production) and muscle mass. **Supplementing in creatine enhances the effects of training and thus enhances the regulation of blood glucose. This improved glycemic control could be beneficial for people with type 2 diabetes and those at risk of developing it. *It's important to note that patients should monitor their symptoms and might need to adjust their treatment accordingly with the help of their health practitioner.***

CREATINE & THE FEMALE CYCLES

OVERALL HORMONAL HEALTH

- The female reproductive organs are some of the most regenerative and energetic tissues within the body, reproductive health and success are intricately linked to energy metabolism.
- From a training standpoint, creatine may help counteract performance reduction caused by menstruations. The anti-inflammatory and recovery effects of creatine extend to the improvement of menstruation-related symptoms (bloating, inflammation, cramps).
- The accumulation of endogenous creatine in the endometrium is thought to contribute to the development of endometriosis. Although on a cellular level, creatine reduces cellular iron concentration and oxidative stress. The research is ongoing and people suffering from endometriosis could consider *not* taking creatine if their symptoms worsen.

REPRODUCTION:

- Changes in creatine metabolism happen throughout the reproductive cycle, low creatine availability has been linked to reduced fertility and specific pregnancy-related pathologies such as preterm delivery, brain injury and vasoconstriction. **Studies suggest that both natural pregnancies and artificial reproductive therapies could benefit from creatine supplementation.**
- Pregnancy is a time of elevated metabolic activity and extra nutritional requirements by the mother, many problems arise from an inadequate nutrient supply to the placenta and foetus. There is a rise in creatine levels in organs of the reproductive system (myometrium & endometrium) from conception to labor and the collective data suggest that maternal creatine needs increase due to the growth and the metabolic demands of the foetus. **Creatine could be a tool to increase energy and nutrient availability to the placenta and foetus.**
- **On the mother's side, creatine supplementation improves overall health and wellbeing,** as well as facilitating the experience of the delivery (especially for those whose diet lacks animal protein).
- Preterm infants may not be able to synthesise creatine endogenously if their organ development hasn't reached capacity. **The creatine status of preterm infants is not known but it is believed that creatine (in the mother's milk or as a supplement) could help sustain life and development of the organs and brain.**

AROUND MENOPAUSE

- Creatine supplementation has many benefits for women around around menopause. The typical complaints of these periods are lack of sleep, depression symptoms (due to hormonal variations), lack of energy and brain fog. **All these symptoms can be improved thanks to proper nutrition and creatine supplementation. In combination with resistance training creatine also helps maintain muscle mass, improve strength, and bone health.**

BRAIN & MENTAL HEALTH

- The presence of a specific form of creatine in the brain suggests that creatine plays a vital role in the brain's energy metabolism too. **Creatine has neuroprotective effects, it improves cognitive functions (memory, attention, mental fatigue), reduces the impacts of stress and age, and slows down neurological decay.** Studies suggest that it could benefit people with neurodegenerative disorders such as Parkinson's and Huntington's disease.
- As noted above, creatine acts on physical and mental fatigue. **Supplementation has positive effects on the symptoms of a 24-hours sleep deprivation such as mood, choice reaction time, coordination, and cortisol levels.** It can be an interesting supplement to alleviate symptoms of chronic fatigue.
- Creatine supplementation reduces the severity of mild concussions, traumatic brain injuries and spinal cord injuries. It has become a staple for contact/combat sports athletes (ex: American football and MMA) and is currently being researched to help patients with brain injuries recover better and faster.
- **Recent studies show that creatine has antidepressant-like effects.** Combined with other forms of therapies it can help decrease the symptoms of depression, the resistance to treatment and enhances the brain's health and the response to medication (especially in women and young populations).

Note that many of these studies were conducted using over 10g of creatine monohydrate per day, this dosage goes beyond the general recommendation of 3-5g (or 0,3g/kg)/day. Higher dosages can be worth a try but do check with a knowledgeable doctor first.

OTHER POTENTIAL BENEFITS

The minimal consumption of 3g/day may also have effects on:

- lowering cholesterol, triglycerides and/or blood lipid levels,
- reducing the accumulation of fat on the liver,
- reducing the progression of some forms of cancers,

The list of the benefits is long but creatine is not magic.

It is the fundamental metabolic roles of creatine that allow the brain, the heart, other organs, and all the physiological processes of the body to have more capacity to do their job, improving sustainability, recuperation, healing and growth.

4. OPTIMISING CREATINE CONSUMPTION

CREATINE IN FOOD:

The first step before supplementing is to eat. Not just because of creatine itself but also because we need all the other nutrients that food is made of and some of them play a role in creatine absorption itself. As we've seen earlier, creatine is mainly found in red meat and fish, the 3 amino acids that we use to synthesise our endogenous creatine can be found in meats but also in some plant.

Creatine rich sources:

- red meat,
- turkey, chicken,
- pork,
- venison,
- tuna,
- salmon, herring,
- cod.

Arginine, glycine and methionine sources:

- the foods mentioned aside,
- eggs,
- milk, cheese,
- seeds, nuts,
- peas, beans,
- spinach,
- seaweed.

NUTRITIONAL CONSIDERATIONS:

- Females are reported to have a 20% lower synthesis rate of endogenous creatine than males, as well as a 30-40% lower creatine intake through their diet.

Females could benefit from higher intakes.

- **Vegetarians have been reported to have muscle creatine and PCr stores about 20-30% lower than non-vegetarians.** Daily creatine needs can also be higher for people with deficiencies or whose diet doesn't optimise the saturation of their creatine stores (lacking over 1g/day).
- Some people are not reactive to supplementation possibly because their body already synthesises enough creatine from their diet.

CONDITIONING CONSIDERATIONS:

Every day the body breaks down around 2g of muscle creatine into creatinine that is then excreted through urine. **More muscle tissue leads to more degradation of creatine, so individuals with larger muscle mass and/or higher physical activity levels should consume more creatine through their diet or via supplementation.**

CHOOSING QUALITY

Supplement manufacturers have little obligation to provide clear information on their products, to follow strict policies, or to have been certified by a third party - *especially internationally*. **Cases are regularly filed against producers for false health claims and questionable safety, many products have little to no evidence to support efficacy despite still being available for purchase.** This can at best lead to a waste of money and at worse contamination with impurities or banned substances (ex: steroid precursors). An analysis from 2022 showed that 875 of 3132 (around 28%) of the supplements tested contained undeclared substances including anabolic-androgenic steroids.

The creatine to go for on a training/recovery standpoint is synthetic Creatine Monohydrate (made from sarcosine and cyanamide). It is the most bioavailable, efficient and safe. It has been tested times and times again and while some alternative forms have their own benefits (like water solubility), they are usually inferior in increasing muscle creatine content (which is the main goal here).

Over the few last decades, clinical trials have been mainly performed with the **creatine monohydrate Creapure by AlzChem (Germany)**. It has the highest levels of safety and effectiveness and is generally recognised as the gold standard. AlzChem produces creatine for other supplements brands, they don't sell to the public, you can find the list of their clients on their website and look for their logo and labels on the packaging.

 **Creapure®**



SIDE EFFECTS

Creatine monohydrate has very few side effects and it is considered safe for most people.

The side effects are related to creatine pulling water into the cells, which can be dehydrating particularly when the loading is done at high dosages and/or the general water intake is not optimal. They include:

- upset stomach,
- muscle cramps,
- dehydration.



DOSAGE

The first step is to achieve muscular saturation, this *loading* can be quick or slow:

DOSAGE	DOSAGE	PROS	CONS
FAST LOADING (5-7 days to saturation)	1.To reach the intake of 20g/day: take 4-5g of creatine (or 0,3g/kg of bodyweight) with water, 4-5 <i>times during the day</i> for 5-7 days. 2.Then decrease to 3-5g or 0,1g/kg of BW daily.	The effects are quickly felt.	Higher risks of bloating and digestive discomfort.
SLOW LOADING (3 weeks to saturation)	Consume 3-5g or 0,1g/kg of BW daily.	Easier on the digestive system.	The effects can take around 2 weeks to be felt.

How to know how much to take?

- If it's your first time you can take 3g (usually a scoop - check the package).
Some people's digestive system is more sensitive than others, so don't hesitate to reduce the dosage if you feel discomfort - at least until you get used to this supplement.
- Then, *as said in the parts on nutritional and individual considerations*, you can stay where you are or increase. Vegetarians, women, and people with lots of muscles, high levels of activity, chronic illnesses or inflammation may benefit from higher dosages (up to 10g - sometimes above but check with your doc first).
- *Whatever you choose keep on taking your creatine every day, even when you're not working out.*
- Creatine can be taken everyday for +5 years without any adverse effects.

When to take your creatine?

- Once the tissues are saturated, the time when you'll take your creatine doesn't really matter, you could take it at breakfast or with your last meal, the most important is that you take it daily.

If you really want to optimise your intake here's what can be done:

1. **before training:** can enhance training performances which then can lead to improved adaptation and more muscle building. That can also give you a mental push to train harder and have a better session.
2. **during training (long lasting/intense sessions or stage performances):** can sustain energy production throughout the session and make the performance "easier" to go through.
3. **after training:** can enhance recovery and muscle building, allowing your body to replace and use some of the energy that it has used during training for other physiological processes.

BOOSTING ABSORPTION

- While creatine can easily be taken with water, it appears that consuming it with carbohydrate and/or protein increases muscular creatine retention. So don't hesitate to either take your creatine around a snack or a meal, or drink it with milk, in a smoothie, etc.
- Caffeine on the other hand seems to decrease the efficacy of creatine and worsen the progression of Parkinson's disease (for caffeine intakes greater than 300 milligrams - above 3 cups of coffee) - further research is needed on this information.

STOPPING SUPPLEMENTATION

As said in the physiology part, the body reduces its synthesis when you're taking creatine and goes back to its normal production once supplementation has stopped, going back to baseline can take a few weeks, depending on the dosages and the duration of the supplementation.

During the time when the body readapts it's possible to feel side effects such as fatigue, muscle loss or weakness, bloating, and/or loss of water weight. These side effects are logical given that less creatine is pulling water to the muscles and less is available to help with energy production.

If you decide to start taking creatine again, you'll have to go through the whole creatine loading phase to saturate your tissues again.

5. COMMON QUESTIONS & MISCONCEPTIONS

Despite being one of the most researched compounds, misconceptions about creatine are quite common. Here are some short answers to the most frequent ones.

1. Creatine is an anabolic steroid: heck no!

Anabolic steroids are a synthetic version of testosterone, a hormone that is produced in higher proportions in males and less in females. Testosterone naturally enhances muscle mass and strength, it's basically the reason why males are naturally stronger than females. Steroids increase the efficiency of testosterone and the expression of certain genes but they are *controlled drugs*, their use is illegal in many sports and competitions and they can lead to many health issues.



While the physiological and performance outcomes are similar, creatine and anabolic steroids have completely different chemical structures, physiological pathways, side effects and legal categorisations.

2. Creatine leads to water retention: maybe for a week.

Creatine increases the body's water in the sense that it is absorbed into the cells *with* water, potentially increasing intra-cellular water (which is an important cellular signal for muscle synthesis). This extra amount of intra-cellular water is too low to be considered as "increased water retention".

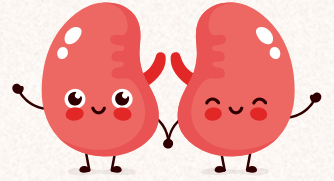
When creatine can play a role in water retention is during the first few days of supplementation, especially at high dosages (20g/day during 5-7 days) and without enough hydration, this is one of the recognised side effects of creatine that usually disappear after the first week.

3. Creatine causes hair loss/baldness: nop.

This idea seems to come from one study from 2009 when male participants taking creatine experienced an increase in dihydrotestosterone (DHT), a metabolite of testosterone that can bind with androgen receptors in hair follicles and cause them to shrink, ultimately leading to hair loss. **While the levels of DHT were higher they remained in the normal clinical limits and the increase could also have been caused by intense resistance training.** No study so far has reported hair loss or baldness in humans.

4. Creatine causes kidney damage/renal dysfunction: nop.

This belief seems to come from 2 things: a flawed study from 1998 that has been corrected by multiple other studies since and the idea that high creatinine levels in blood and urine may be “overloading” the kidneys. This idea is unsupported, firstly creatinine levels are dependant to the amount of muscle mass and consumption of red meat (as seen in the physiological part of this doc), healthy kidneys adapt with the rest of the body ; secondly, creatine has been studied since the 90s and there is no evidence to support that claim.



5. Creatine increases fat mass: nop.

One should not confuse fat mass and total body mass. Yes creatine leads to an increase in total body mass as it facilitates the increase of lean mass (muscle mass) but it has no effect, whether in loss or gain, on fat mass.

6. Does creatine play a role in cancer progression?

This question is difficult to answer because studies are ongoing and results are not out yet. Creatine (and cyclocreatine - its analog) is considered a cancer suppressive metabolite (it suppresses subcutaneous cancer growth and enhances the activity of anti-tumors cells). Lately it's been pointed out that creatine and creatine kinase may have a role in the *promotion* of growth of certain tumours and the metastasis of colorectal, breast and pancreatic cancer. It's important to note that the results are (for now) contradictory, this study from 2025 on +25 000 participants at different ages and physical condition suggested that higher dietary creatine intake *reduced* cancer risks, even more so in males and older populations.

It could be that creatine promotes cancer in pathways we don't understand yet, but that its anti-inflammatory and immune promoting properties, as well as the wide range of actions that ATP and energy metabolism have on the rest of the body outweighs the risks. *As such, individuals at risks should seek medical counsel first.*

7. Is creatine beneficial for older populations? YES but...

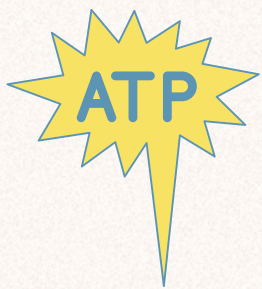
There is an increasing number of studies on the matter and yes, creatine supplementation can play a therapeutic role in various clinical conditions as it increases functionality (strength, energy availability). The one thing to keep in mind is that creatine doesn't work alone, it is more effective when combined with appropriate training and nutrition.

Older adults are at higher risks of muscle loss and low bone density (especially women for that one), they should train their strength and creatine can be a tool to enhance the effects of their training on the whole health spectrum.



SUMMARY

- **Creatine is a natural compound that we consume and synthesise through our diet:**
 1. As exogenous creatine via the intake of animal proteins, especially red meat and fish.
 2. As endogenous creatine (synthesised in the body) from the intake of amino acids arginine, glycine and methionine, present in dairy and animal proteins as well as some plant protein and nuts.
- On average our body synthesises around 1-1,5g of creatine everyday, the remaining should be covered by our diet.
- **95% of the creatine in our body is found in skeletal muscles.** The 5% left are stored and used in the brain, heart and testes.



- **The creatine in the muscles is stored mainly in the form of phosphocreatine. It is used to produce powerful but short burst of energy through the ATP-PCr system (phosphagen system).** More creatine in the tissues increases the capacity of re-synthesising energy which enhances force outputs and anaerobic performances, and decreases the need for pauses and lactic acid production.

- **Performance benefits:**

1. Direct energy/force production for activities that require high levels of intensity/power on short durations such as sprints, combat sports, gymnastics.
2. The general improvements of energy metabolism may also benefit longer durations activities in the storage and use of glucose and glycogen.
3. Increase in muscle and bone mass via the improved training capacity/adaptation.
4. Improved cognitive functions (coordination, speed, agility) and reduction of neurological damages due to shocks (ex for contact/combat sports).
5. Easier recovery and potential effect on soreness/training induced muscle damage.

- **Other health benefits:**

1. The antioxidant and anti-inflammatory properties can help maintain and protect tissues in the case of muscular dystrophy, chronic inflammations and rehabilitation.
2. Creatine increases intra-cellular water, the uptake of glucose in the cells and the sensitivity to insulin. This improved use of blood sugar can reduce the risks of developing type 2 diabetes and help control it.

3. Endogenous creatine plays an important role in the different stages of female's reproductive cycles:

- increasing creatine consumption can help reduce menstruations symptoms such as bloating, cramps, fatigue, and inflammation,
- thanks to its health sustaining properties it increases fertility and the mother's wellbeing from the start to the end of pregnancy. It is also an important component of the foetus's health and development and could be used to reduce risks and impacts of preterm birth.
- creatine can help manage the symptoms of menopause (in all stages) such as brain fog, fatigue, lack of sleep, depression, and muscle and bone loss (when paired with physical activity).



4. The improved energy metabolism and antioxidant effects that take place in the muscles also happen in the brain. Making creatine an interesting tool to reduce the impact of neurodegenerative diseases such as Parkinson's and Huntington's diseases.

5. Creatine reduces the detrimental effects of lack of sleep, helps maintain stable mood and has antidepressant-like properties that may increase the efficiency of therapy/medication.

• Individual considerations & supplementation:

1. Individual who's diet is rich in meat, fish and protein and do not participate in intense or regular training may not need to supplement their diet. This is especially true for males.
2. Females, vegetarian, vegan and individual who train regularly/have a high muscle mass could benefit from supplementation. This is also true for people who's body doesn't synthesise creatine or struggle with chronic inflammation, fatigue and degenerative diseases.
3. Creatine monohydrate is the creatine to go for. Look for trustworthy and third-party tested labels such as *Creapure*.
4. Supplementation will saturate the tissues, and then maintain a daily intake of 3-5g/day (or 0,1g/kg bodyweight/day). Saturation can either be done through a fast loading phase (5-7 days) with *high* intakes of 20g/day divided in 4-5 takes or a slow loading phase (3-4 weeks) with *maintenance* intakes of 3-5g/day (or 0,1kg/BW/day).
5. Creatine has little side effects, bloating and digestive discomfort can happen in the first week especially with the high intake loading and if overall hydration isn't optimal.
6. Consumption before training may enhance performance, after training may enhance recovery but in general once saturation is achieved creatine can be taken anytime.
7. To improve absorption drink your creatine with carbohydrate/protein rich foods and avoid drinking it with caffeine.

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Got a question?
Want to know more?
Let me know!

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