New muscle hypertrophy biohacks with creatine and nano-molecular leucine in 2026

How to grow and develop muscles more effectively with creatine, leucine, and caffeine? Plus, exercise, of course.

Creatine Monohydrate vs. Creatine HCL: Benefits, Personalized Dosages, and Optimizations for Biohackers and Advanced Nutrition Enthusiasts

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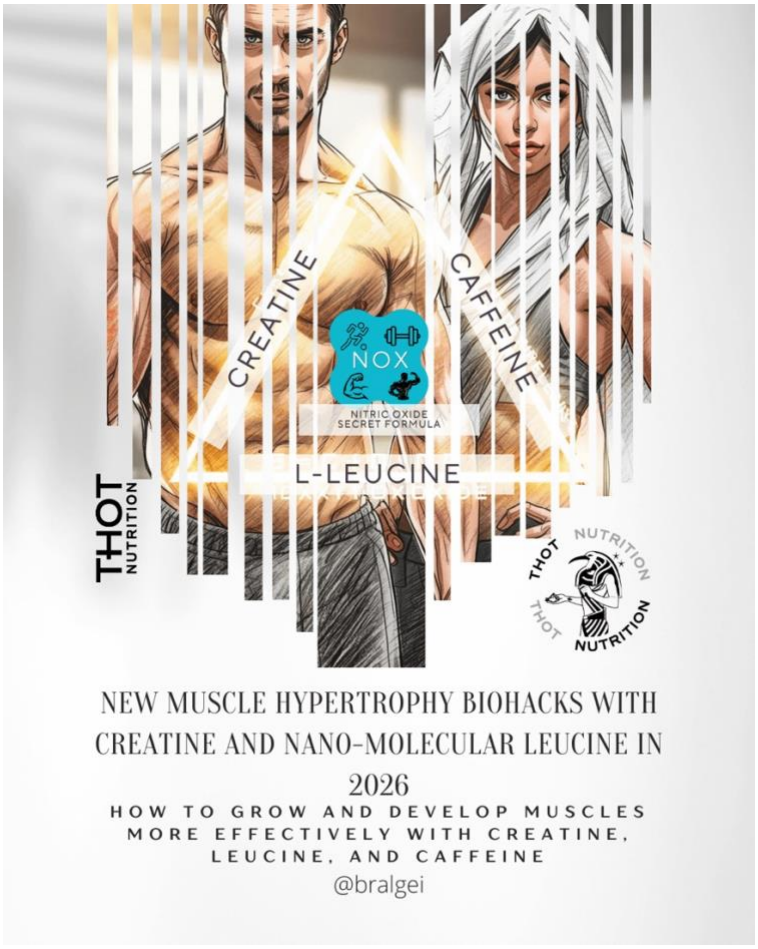
Sources: Based on personal experiences, advanced nutrition and biohacking expertise; recent studies (2024–2026), resources from Thot Nutrition and Bralgei.com, podcast and experts' opinion.



As a biohacker with over 30 years of experience, I have tested numerous variants in vivo, especially since I am lazy and dislike inefficient work. When I got serious about sports and creatine, I had access to the highest quality amino acids (L-leucine being the most important).

Let me be very clear from the beginning. The star of this secret is L-Leucine in nano-molecular form because size matters, but in combination with other elements that I will emphasize here, a Greate bio-hack is available. Everything you need to know about L-Leucine and the amazing benefits, you can find here: **L-Leucine; the best key to muscle recovery, health & longevity in 2023**. Now, let's get back to creatine.

I realized that I wanted to recover my body as quickly and efficiently as possible. And I achieved this at over 50 years old, without any experience or discipline in sports. So, it is possible, but let's learn the details and secrets.

Simultaneously with my sports experiments, I founded Thot Nutrition, a company that produces nano-molecular essential amino acids—the only one with this high standard of quality. Size matters in biology and performance (information about the nano-molecular essential amino acids and biohacking project: www.thotnutrition.com and www.bralgei.com). Pay close attention to these details, because they matter. Everything matters.

Creatine monohydrate or its HCL variant is becoming an essential tool for body optimization, especially in muscle reconstruction after long periods of inactivity. On my websites and YouTube channel, you will find innovative approaches, debunking nutrition myths and promoting supplements such as essential amino acids for hypertrophy and longevity. This article explores creatine monohydrate and its HCL variant, focusing on personalized dosages, optimized absorption, cognitive and women's benefits, plus a bonus on a "golden triangle" for accelerated muscle growth. We rely on recent studies (2024–2026 – references at the end) for a balanced perspective, suitable for those who are curious, informed, or involved in personal research.

1. What is Creatine and What Are Its Main Forms?

Creatine is an organic compound produced naturally in the body from amino acids such as arginine, glycine, and methionine, stored mainly in muscles (95%) and the brain. Its main role is to regenerate ATP (adenosine triphosphate), the energy currency of cells, enabling explosive efforts and resistance to fatigue. Supplementation increases phosphocreatine reserves, improving performance by up to 10–20% in anaerobic exercise, according to recent meta-analyses.

ATTENTION: Bypassing the mitochondrial cycle through direct phosphate group transfer is, in fact, one of the greatest advantages offered by creatine. Direct, simple, and on demand. It's brilliant.

The two main forms discussed here are:

- Creatine Monohydrate (CrM): The most researched and inexpensive form. Studies from 2025–2026 show that its absorption is over 99% in oral doses, increasing muscle mass and strength by 1–2 kg in 8–12 weeks of training. For example, a 2025 study confirms its superiority in hypertrophy compared to other forms, due to its high bioavailability. However, it can cause bloating or digestive problems at high doses, due to its lower solubility. If you pay attention to dosages and distribution, it will be fine.

- Creatine HCL (Hydrochloride): A more soluble variant (much more effective; at least twice as effective as the mono variant and especially in water/I prefer mineral water), with superior absorption, allowing for smaller doses (1.5–3 g vs. 3–5 g for CrM). Recent research indicates fewer gastrointestinal side effects, making it ideal for sensitive individuals. A 2025 study shows that HCL improves hypertrophy and hormonal responses similar to CrM, but with lower doses. Its price is higher, but it is worth it for those with sensitive stomachs.

Both forms are safe, with CrM having more long-term studies (up to 5 years with no major adverse effects). The choice depends on tolerance: start with CrM and switch to HCL if problems arise.

Please do your own research and listen to podcasts on creatine.

Education and Podcasts sources for creatine and creatine related topics:

1. *FoundMyFitness (Dr. Rhonda Patrick) – #100 The Optimal Creatine Protocol for Strength, Brain, and Longevity (March 2025): Features leading researcher Dr. Darren Candow, discussing 10g/day dosages, cognitive benefits, and anti-aging effects.*
    - *Creatine is one of the most extensively studied dietary supplements globally, with its history and research spanning nearly two centuries. This popular supplement was first discovered in 1832 and commercialized as a dietary supplement in the 1990s. Initially popularized among elite athletes—particularly body builders and strength athletes—creatine had gained broader recognition due to its effectiveness for enhancing exercise performance and muscle growth.*
    - *Dr. Darren Candow has extensively explored creatine's effects across various populations and health conditions, contributing over 140 published scientific papers which have been pivotal in demonstrating creatine's safety and efficacy beyond the athletic domain and expanding our understanding of the therapeutic and health-promoting applications across age groups. In this episode, he discusses:*
        - *How creatine speeds up recovery between sets*
        - *The two ways creatine boosts muscle strength*
        - *Loading vs. daily dosing*
        - *Why 5 grams might be insufficient for brain health benefits*
        - *Why stressed brains benefit most from creatine supplementation*
        - *Creatine for counteracting sleep deprivation (and the dose needed)*
        - *Does creatine improve sleep on training days?*
        - *Can creatine help with depression?*
        - *Does timing matter—and should you cycle it?*
        - *Why high-dose caffeine might blunt creatine's benefits*
        - *Why creatine is linked (wrongly?) to baldness*
        - *How to pick the best creatine supplement*

2. *High Performance and Ultimate Human Podcast – Gary Brecka on Diet Myths & Creatine (Dec 2025): Discusses the biological impact of creatine. The real secret to longevity isn't found in trendy diets or extreme hacks, it's in mastering the basics. In this episode, human biologist Gary Brecka shares why the world's longest-living populations thrive not through keto, paleo, or vegan plans, but by avoiding processed foods altogether. Gary also debunks popular health myths around fasting, carbs, and supplements, explaining why biology, not trends, should guide our choices. He highlights the everyday habits that matter most: eating whole foods, prioritising protein, sleeping well, staying mobile, and building strong connections.*
3. *What Men & Women NEED To Know About Creatine - Dr. Rhonda Patrick and Steven Bartlet DOAC*
4. *The Proof with Simon Hill – 6 Biggest Creatine Questions Answered by Science (Feb 2025): Addresses common myths, safety during pregnancy, and whether timing matters.*

5. *Just Ingredients – 176 - Why YOU should be taking Creatine w/ Dr. Darren Candow (Nov 2024): A deep dive into why creatine is essential for muscle, bone, and brain health.*
6. *The Peter Attia Drive Podcast – #369 – Rethinking protein needs... benefits of creatine (Mar 2025): Discusses the role of creatine in muscle preservation and longevity.*
7. *Fuel Your Strength – Creatine for Strength Training: Myths + Truths w/ Dr. Scott Forbes (2024): Focuses on the synergy between creatine and exercise.*
8. *The Nick Bare Podcast – Creatine 101: Everything You Should Know (Dec 2025): A comprehensive overview for athletes looking to improve performance.*
9. *Creatine Breakthrough - When and How Much Should You Take? | The ATP Project 341 - In this episode of the ATP Project, Jeff and Steve discuss the breakthrough science behind the most widely researched supplement on the market, Creatine.*
10. *Fitness Stuff (for normal people) – Ep 5 / Creatine: A Complete Guide (2024): A, myth-busting, straightforward guide to creatine. Is there a more talked about, and even controversial supplement other of creatine? Today we break down the single most researched supplement on the market, sorting out what claims hold their water, and which have holes in them. Breaking down the research behind each myth, claim, and trend. We go over who might want to think about taking it, how much to take, when to take it, and everything in between.*

2. Customized Doses: From Standard to Optimized

The standard recommended doses are 3–5 g/day for maintenance, with a loading phase of 20 g/day for 5–7 days to saturate the muscles quickly. However, personal experience shows that these doses may be insufficient for some. For example, at 72–74 kg, 5 g/day did not produce noticeable effects; increasing to 10 g, then 15 g, brought visible differences, with loading at 20 g/day and maintenance at 15 g. This highlights the importance of personalization—everyone's body responds differently, influenced by age, muscle mass, and diet.

Recent studies support higher doses for maximum benefits. A 2025 meta-analysis shows that doses of 5–10 g/day increase strength and muscle mass more effectively in trained adults, without increased risks. For those over 50, as in the case of rebuilding after inactivity, doses of 10–15 g can compensate for the natural decline in creatine reserves. However, you need to monitor initial water retention (1–2 kg), which stabilizes over time. A hack for this scenario is the sauna. It eliminates excess interstitial water.

3. Optimizing Absorption: Simple Tricks for Maximum Efficiency

The standard absorption of creatine monohydrate (CrM) is estimated at approximately 40–50% under normal conditions (without optimizations), but it can be significantly increased—up to 80% or more—through practical adjustments based on scientific evidence. These tricks exploit the physiological transport mechanisms of creatine, which involve the specific SLC6A8 transporter (creatine transporter – CT1 or CRT), dependent on sodium and chloride (Na^+/Cl^--dependent). This transporter uses the electrochemical gradient created by sodium to move creatine against the concentration gradient into cells, particularly in muscles and the brain.

The Main Mechanism of Sodium/Salt Optimization

• Creatine is transported into cells via the Na^+/Cl^--dependent transporter SLC6A8, which requires extracellular sodium for efficient functioning. Increasing the concentration of sodium and chloride in the environment improves creatine absorption in muscles.

• Recent evidence (2025–2026) confirms that increased sodium/chloride levels amplify creatine absorption and transport into tissues, including muscle and brain. For example, studies show that the presence of sodium facilitates creatine entry, and combinations with electrolytes (including sodium) can increase retention and effectiveness.

• Practical experience shows that adding a little salt (0.5–1 g to 5 g of creatine) to the dissolving liquid optimizes this process, leading to a faster feeling of muscle "fullness" and more pronounced benefits.

The Role of Temperature (Hot Water/Warm Liquids)

• The solubility of creatine monohydrate increases linearly with temperature: ~14 g/L at 20°C, ~34 g/L at 50°C, and ~45 g/L at 60°C. Warm water (40–50°C) dissolves creatine much better than cold water, reducing sedimentation and improving availability for intestinal absorption.

• Practical recommendation: Dissolve 5 g of creatine in 200–300 ml of warm mineral water (not hot, to avoid minimal degradation). Mix well for 30–60 seconds—complete dissolution maximizes rapid absorption.

Combination with Proteins and Carbohydrates from Dairy Products (Ayran, Diluted Yogurt)

• Ayran (a traditional mixture of water, yogurt, and salt) or diluted yogurt provides an optimal environment: protein + carbohydrates + sodium. Carbohydrates stimulate the release of insulin, which acts as a "key" for transporting creatine into muscle cells (insulin increases the expression and activity of the CRT transporter).

• However, the fat in dairy products inhibits a sharp rise in the insulin curve, which provides controlled absorption.

• Evidence from studies shows that ingesting creatine with carbohydrates (or protein + carbohydrates) increases total body creatine retention and muscle uptake compared to

creatine taken alone. Combining it with dairy adds a synergistic effect due to the slightly alkaline/protein environment and natural sodium.

- Practical example: Mix 5 g of creatine in 200 ml of fresh ayran (natural yogurt diluted with water + 0.5–1 g of salt). Pleasant taste, boosted absorption, and good digestive tolerance.

Daily Practical Recommendations for Maximum Absorption

- • Optimal basic recipe (for 5 g creatine): 200–250 ml warm mineral water (40–50°C) + 0.5–1 g sea salt/Himalayan salt + optional 50–100 ml diluted natural yogurt (or ayran). Stir vigorously until completely dissolved. Drink immediately.
- • Daily variations:
- o In the morning: With ayran + salt for an energy boost.
- o Pre-workout: In warm water with salt + a little natural grape or pineapple juice, for example (avoid excess acid). Or again with ayran.
- o Post-workout: With a protein shake or yogurt for insulin synergy.
- • What to avoid: Acidic juices (orange, pure citrus – low pH accelerates conversion to creatinine in solution). Although degradation is minimal in the stomach (pH ~2) (creatine is stable at very low pH), minor loss may occur in prolonged acidic drinks if you leave the mixture for hours.

- ATTENTION: The insulin spike (increase in the curve) is necessary to prevent muscle breakdown. Carbohydrates and insulin spikes do NOT help muscle growth; only amino acids do that. But it is useful to prevent muscle breakdown through controlled insulin spikes. Everything is controlled.

Summary of Observed Benefits

With these simple adjustments (sodium + heat + protein/carbohydrate environment), absorption can increase from 40–50% to 80%+, leading to faster muscle saturation, fewer doses required for similar effects, and reduced digestive side effects at high doses. These tricks are supported by physiological mechanisms (Na^+-dependent transporter) and recent studies on electrolytes, solubility, and nutrient combinations. Test them yourself and adjust according to tolerance—overall hydration (3–4 L/day) remains essential for optimal retention.

4. Dosage Throughout the Day and Management of Side Effects

At high doses (15–20 g), dividing the intake into 3–4 doses prevents diarrhea and allows for steady absorption. For example: 5 g in the morning, 5 g before training, and 5 g after training. For sensitive individuals, HCL is the solution—doses of 1.5–3 g/day offer similar effects

without bloating, according to a 2025 comparison. Drink plenty of water (3–4 L/day) to prevent dehydration.

The article mentions the appropriate dosage in several places.

5. Cognitive Benefits: Creatine as "Fuel" for the Brain

Creatine isn't just for muscles—it nourishes the brain, providing direct energy via ADP-ATP, bypassing the mitochondrial cycle for efficiency under stress. Studies from 2024 show that supplementation increases cognitive performance, especially in sleep deprivation or advanced age, preventing pH decline and improving memory. For biohackers, 5–10 g/day can improve focus and mental endurance, with neuroprotective effects against oxidation.

Benefits of Creatine for the Brain: What Recent Studies Show (2024–2026)

Creatine (especially the monohydrate form) is not just a muscle supplement—it also plays an important role in brain health. The brain consumes about 20% of the body's energy, even though it accounts for only 2% of body mass. Creatine helps to rapidly regenerate ATP (adenosine triphosphate – cellular "fuel") by increasing phosphocreatine reserves in neurons. This provides additional energy during times of metabolic stress (sleep deprivation, intense mental effort, hypoxia, aging, or neurodegenerative diseases).

The brain has a blood-brain barrier that limits the entry of creatine, so supplementation (especially moderate to high doses) can increase brain creatine levels by 5–11% (measured by NMR spectroscopy), especially in those with low reserves (vegetarians, the elderly, menopausal women, or people with chronic stress).

"Size matters"

This is where the leucine we produce at Thot Nutrition comes in handy. Its size is less than 500 daltons, which represents the brain barrier (blood-brain barrier). This is also the secret behind the combination of creatine, leucine, caffeine, and NO (nitric oxide).

Key Cognitive Benefits Demonstrated in Recent Studies

1. Memory Improvement (Most Solid Effect): The 2024 meta-analysis (Frontiers in Nutrition, 16 RCTs, 492 participants, ages 20–76) shows a significant positive effect on memory (SMD = 0.31, moderate GRADE evidence). The benefit is more pronounced in adults with pre-existing conditions, women, and people aged 18–60. Reviews from 2025 (Nutrition Reviews) confirm positive effects on short-term and spatial memory in healthy adults over 60–70 years of age.
2. Processing Speed and Attention: The same 2024 meta-analysis shows improvements in information processing time (SMD = -0.51) and attention span (SMD = -0.31), although with weaker evidence (low certainty). Study 2024 (Scientific Reports): A single high dose (15–20 g) mitigates cognitive decline after a night of sleep deprivation – better performance in working memory and reaction speed.

3. Resistance to Mental Fatigue and Stress: Creatine reduces subjective fatigue and maintains cognitive performance under stressful conditions: sleep deprivation, prolonged mental effort, or hypoxia. Example: Studies from 2024–2025 show that it helps maintain mental clarity during periods of burnout or after poor nights of sleep.
4. Promising Effects in Aging and Neurodegenerative Diseases: Pilot 2025 (Alzheimer's & Dementia): 20 g/day creatine for 8 weeks in Alzheimer's patients (average age 73) → 11% increase in brain creatine + moderate improvements in overall cognition, working memory, executive function (List Sorting, Flanker, Oral Reading). No major adverse effects. Review 2025: Moderate benefits for memory and processing speed in healthy older adults or those at cardiovascular risk. Neuroprotective potential: Reduces oxidative stress, supports mitochondria, and may slow decline in Alzheimer's or MCI (preliminary evidence, large RCTs needed).
5. Benefits for Women and Specific Populations: Recent meta-analyses show greater effects in women (possibly due to lower natural creatine reserves). Vegetarians/vegans: Supplementation compensates for low dietary intake → more pronounced cognitive benefits.

Recommended Doses for Cerebral Effects (Based on Studies 2024–2026)

• Daily standard: 5 g/day (modest effect, good for maintenance).

• For optimal cognition/stress: 10–20 g/day (divided into 2–4 doses), especially during periods of poor sleep or mental exertion.

• Alzheimer's/elderly: Pilot studies have successfully used 20 g/day (measurable brain growth). Especially when combined with products that boost nitric oxide.

• Duration: Effects appear in 1–4 weeks; for the brain, higher and longer doses seem to be more effective than for muscles.

Creatine is safe (decades of data), with few adverse effects (initial water retention, rare gastric discomfort). Drink plenty of water and consult a doctor if you have pre-existing kidney problems.

6. Specific Benefits for Women

Women benefit greatly from creatine, especially during menopause, when estrogen decreases, leading to muscle and bone loss. Studies from 2025 show that 3–5 g/day, combined with training, increases muscle mass, strength, and bone density, counteracting sarcopenia. It also improves energy and mood, which are essential during hormonal transitions. Dosages are similar to those for men, adjusted for weight.

Specific Benefits for Women: Why Creatine Is a Powerful Ally During Perimenopause and Menopause

Women benefit particularly from creatine supplementation, especially during periods of hormonal transition such as perimenopause and menopause. Decreased estrogen accelerates muscle loss (sarcopenia), reduced bone density (osteopenia/osteoporosis), and the onset of chronic fatigue, mood swings, and cognitive decline. Creatine helps counteract these effects by increasing phosphocreatine stores in muscles and the brain, improving cellular energy production (ATP) and supporting muscle protein synthesis.

Key Benefits Demonstrated in Recent Studies (2024–2026)

1. Preventing and Combating Sarcopenia (Loss of Muscle Mass and Strength): During menopause, muscle loss accelerates (3–8% per decade after age 30, faster after menopause). Creatine, combined with resistance training, increases lean muscle mass and strength more effectively than training alone. Meta-analyses and RCTs from 2024–2025 show additional gains in appendicular muscle mass and strength (e.g., bench press, squat, leg extension). Example: Postmenopausal women taking 5 g/day creatine + RT gain 1–2 kg lean muscle mass in 12–24 weeks, compared to the placebo group. Typical doses: 3–5 g/day (or 0.1 g/kg body weight), adjusted for weight (e.g., 70 kg → ~7 g/day for maximum effect).
2. Supporting Bone Health and Reducing the Risk of Osteoporosis: Estrogen protects bones; its decline increases the risk of fractures. Creatine does not directly increase bone mineral density (BMD) in many studies, but it improves geometric properties of bones (e.g., cortical thickness, section modulus, bending and compression strength in the femur and tibia). Two-year study (2023–2025 update) on 237 postmenopausal women: Creatine + RT + walking reduces BMD loss in the hip and improves bone strength (modular section +1–2%, cortical thickness +1.7%). Recent meta-analyses confirm that the effect is indirect: stronger muscles pull on bones, stimulating bone remodeling. Clinical benefit: Potential reduction in fracture risk through stronger bones.
3. Improved Energy, Mood, and Cognitive Function: Hormonal transitions lead to fatigue, "brain fog," mood swings, and an increased risk of depression. Creatine provides direct energy to the brain, increasing brain creatine levels (as measured by MRI). 2025 studies on perimenopausal/menopausal women: 1.5 g/day creatine HCl for 8 weeks → improved reaction time, reduced severity of mood swings, improved mental clarity and executive control. Higher doses (5–10 g/day) help reduce mental fatigue and support mood, especially during periods of stress or poor sleep. Advantage for women: Lower baseline creatine levels than men → supplementation has a more pronounced effect.

Recommended Doses and Practical Adjustments for Women

• Daily standard: 3–5 g/day creatine monohydrate (or HCL for digestive sensitivity) – similar to men, but adjusted to body weight (0.03–0.1 g/kg/day).

• For maximum effect during menopause: 5–10 g/day divided (e.g., 5 g in the morning + 5 g post-workout), combined with RT 2–3 times/week.

• Example daily protocol:

o Morning: 5 g in warm water + salt/ayran (for absorption).

o Pre-workout: 3–5 g with low caffeine.

• Safety: Creatine is safe for long-term use in women (studies up to 2 years with no major renal/hepatic adverse effects). Drink 3–4 L of water/day; monitor if you have a history of kidney problems.

Creatine is not just for athletes—during perimenopause and menopause, it becomes an essential tool for maintaining physical and mental independence. Combined with resistance training (isometrics/calisthenics), adequate protein or quality amino acids, and an active lifestyle, it helps counteract negative hormonal effects, providing real gains in muscle mass, bone strength, energy, and mental clarity. If you are at this stage, 3–5 g/day is worth trying for 8–12 weeks—many women report noticeable improvements in daily strength and overall well-being. Consult your doctor for personalization!7. Bonus: Triunghiul de Aur – Mega-Hack pentru Hipertrofie Musculară

The average muscle growth through resistance training is 0.5–2 kg/month for beginners (1.5 kg average in 10 weeks, per review 2025), but it can be doubled/tripled with a personally tested "golden triangle," to which we add a catalyst and a special type of sport. That is, if you want my performance: **1. L-leucină nano-moleculară (de la Thot Nutrition),** doze mari, 5–10 g/zi pentru sinteză proteică),

• 2. Creatine mono or HCL (different higher doses depending on each; on average 10-15 g/day),

• 3. Caffeine (50–100 mg, one espresso),

• CATALYST: NO booster - Nitric Oxide (arginine/citrulline for vasodilation; there are a number of products available, but unfortunately not all of them work equally well; we will soon be launching a specialized product for boosting Nitric Oxide production)

• + ISOMETRIC SPORT: I have a system called "UNDER 2MS" (under 2 milliseconds), but essentially there are different isometric exercises, calisthenics, animal flow, Pilates, etc. (static support for maximum tension without too much movement, or using the body and body weight).

The science and training of the "Under 2 MS" system is available in private training sessions with me.

7. The Golden Triangle: A Detailed Approach to the Mega-Hack for Muscle Hypertrophy

The golden triangle is a strategic combination of supplements and exercises (Under 2ms) designed to accelerate muscle growth (hypertrophy) and combat sarcopenia (age-related muscle loss). This "hack" involves five key factors: nano-molecular leucine (in high doses), creatine (in optimized doses), caffeine (in moderate amounts), nitric oxide (NO) as a blood flow

booster, and isometric exercises as the main form of training. The basic idea is that these elements create a synergy that amplifies protein synthesis, provides rapid energy, improves nutrient delivery, and maximizes muscle fiber recruitment, leading to muscle growth 2–3 times faster than the average achieved through standard training.

Based on my personal experience and recent studies (2024–2026), this combo can transform an average gain of 350–400 g of muscle mass per month (according to meta-analyses on resistance training) into a rate of 700 g–1.2 kg/month or more, especially in people over 50 who are returning to sports after inactivity. I will detail each component, their mechanisms, synergy, and practical implementation, supported by scientific data. Note: These recommendations are general; consult a doctor for personalization, especially if you have health problems

1. Leucina Nano-Moleculară: Activatorul Principal al Sintezei Proteice

Leucine is an essential amino acid in the BCAA (branched-chain amino acids) category, essential for triggering the hypertrophy process. The nano-molecular form (from Thot Nutrition) improves absorption and bioavailability, allowing for more effective doses without digestive side effects.

- Mechanism: Leucine activates the mTOR (mammalian target of rapamycin) pathway, which signals muscle cells to start protein synthesis. Without sufficient leucine, ingested protein is not efficiently converted into muscle mass. Studies show that doses of 3–5 g/day of leucine increase protein synthesis by 25–50% post-workout.

- Triangle benefits: In high doses (5–10 g/day, divided), leucine "ignites" hypertrophy, especially when combined with creatine (for energy) and NO (for delivery). A 2025 review indicates that leucine amplifies the effects of other supplements in hypertrophy, increasing muscle mass by 1–2 kg in 8–12 weeks.

- Recommended doses: 5–10 g/day, taken pre- and post-workout. Avoid doses below 3 g, as they do not trigger mTOR effectively.

2. Creatine: The Energy Supplier for Intense Effort

Creatine (monohydrate or HCL) is one of the most studied supplements, increasing phosphocreatine stores in muscles for rapid ATP production.

- Mechanism: Increases explosive strength, allowing for more repetitions and faster recovery. In hypertrophy, creatine increases cell volume (through water retention), stimulating protein synthesis. Meta-analyses from 2025 show that 5–15 g/day increases muscle mass by 1–2 kg in 8–12 weeks, especially with resistance training.

- Triangle benefits: Combined with leucine, creatine provides energy for mTOR to function optimally; with caffeine, it amplifies performance; with NO, it improves absorption. Your experience (loading at 20 g/day, maintenance 15 g) aligns with studies supporting personalized doses above the standard (3–5 g), increasing hypertrophy from 0.5 kg/month to 1 kg+.

• Recommended doses: Loading 20 g/day (7 days), then 15 g/day divided. For sensitive individuals, HCL at 3–5 g/day.

3. Caffeine: The Performance and Focus Booster

Caffeine (from coffee or supplements) stimulates the central nervous system, increasing strength and endurance.

• Mechanism: Blocks adenosine (cause of fatigue), increases calcium release in muscles, and improves fiber recruitment. Studies from 2025 show that 50–100 mg pre-workout increases performance by 5–10%, leading to higher training volume and accelerated hypertrophy.

• Triangle benefits: Synergy with creatine (studies show the combo increases muscle strength); with leucine, supports protein synthesis; with NO, amplifies vasodilation. A 2024 study indicates that caffeine + creatine increase hypertrophy by 20% more than creatine alone.

• Recommended doses: 50–100 mg (one espresso), pre-workout. Avoid excess to prevent tolerance.

4. Nitric Oxide (NO) Booster: The Catalyst for Blood Flow

NO (from arginine, citrulline, or nitrates) dilates blood vessels, improving oxygen and nutrient delivery.

• Mechanism: Increases muscle "pump," reducing fatigue and speeding recovery. Reviews from 2025 show that NO boosters increase hypertrophy by improving protein synthesis and blood flow, adding 0.5–1 kg of muscle mass in 12 weeks.

• Triangle benefits: Delivers leucine and creatine more efficiently; with caffeine, amplifies ergogenic effect; essential for isometrics, where static blood flow is limited. Studies show synergy with creatine for muscle growth.

• Recommended doses: 3–6 g citrulline/day or 6–8 g arginine, pre-workout.

5. Isometric Exercises: The Effective Form of Training – "Under 2ms"

Isometrics involves static contractions (holding a position), ideal for lazy biohackers because it minimizes time and effort.

I achieved in two years what others usually achieve in four years, and I'm referring to serious athletes, not occasional ones. This is science and much more efficient conversion if you know how to work with your body and not against it. You need to understand what triggers muscle growth and give it exactly what it needs. Ideally, this should be done in overload, with adequate rest and proper nutrition.

• Mechanism: At long muscle lengths (e.g., bottom squat), isometrics recruit fast fibers, inducing hypertrophy similar to dynamic training. Meta-analyses from 2025 show that isometrics increase muscle mass by 0.8–1.7%/week, comparable to heavy lifting. Advantage: Less fatigue, ideal after inactivity.

• Triangle benefits: Isometrics maximizes the effects of supplements through constant tension; combined with NO, it improves nutrient delivery in static positions. Studies show that isometrics + supplements double gains compared to isometrics alone.

• Recommended doses: 3–5 sets/day, hold 20–60 s/set, focus on calisthenics/isometrics (plank, wall sit).

Synergy and Scientific Evidence

This quintet creates a "virtuous cycle": Leucine initiates synthesis, creatine provides energy, caffeine amplifies effort, NO delivers everything, and isometry applies the stimulus. Studies support the synergy: A 2025 review shows that similar combos (creatine + leucine + NO) increase hypertrophy by 1–3 kg/month, double the average of 0.5–1 kg/month in resistance training. The overall average muscle gain is 350–400 g/month (2025 meta-analyses), but with supplements and isometrics, it reaches 700 g–1.2 kg. Experience proves it in practice: "Impossible" results after decades of inactivity.

See studies below:

Practical Implementation

• Daily protocol: Pre-workout: 5 g leucine + 5 g creatine + 50 mg caffeine + 3 g citrulline. Post-workout: Remaining doses.

• Training: 3–4 sessions/week of isometric exercises (e.g., 3x30 s wall squats, planks).

• Nutrition: Moderate caloric surplus (300–500 kcal), protein 1.6–2.2 g/kg body weight.

• Monitoring: Measure muscle circumference monthly; adjust doses if side effects occur.

• Risks: Creatine can cause water retention; caffeine can cause insomnia. Start small.

• CAUTION: It is normal to have elevated creatinine levels in your tests when you are taking creatine. It is abnormal to have elevated creatinine levels if you are not taking creatine. In this case, it is clear that your kidneys are not filtering properly. But if you take creatine, creatinine is produced and eliminated because it is a by-product that must be eliminated through urine.

In conclusion, the golden triangle is an effective, science-backed hack for rapid hypertrophy.

With consistency, you can achieve triple the standard results, debunking nutrition myths.

8. mTOR – Detailed, Accessible, and Practical Explanation for Biohackers

mTOR (mechanistic Target of Rapamycin) is one of the most important "central commands" of your cell. It is an enzyme (kinase) that decides whether the cell grows, repairs itself, synthesizes proteins, or enters "economy mode" (autophagy). In the context of muscle hypertrophy, biohacking, and advanced nutrition, mTORC1 is the main star—exactly the pathway you activate when you take nano-molecular leucine + creatine + isometry.

1. What is mTOR? The Two Complexes (mTORC1 vs mTORC2)

mTOR forms two completely different complexes:

mTORC1 (the one we are most interested in):

• Key components: mTOR + Raptor + mLST8 + PRAS40 + DEPTOR.

• Sensitive to rapamycin (hence the name).

• Responds to: amino acids (especially leucine), insulin/IGF-1, cellular energy (ATP), stress.

• Main functions in muscles:

  o Activates protein synthesis (MPS – muscle protein synthesis).

  o Increases ribosomes (ribosomal biogenesis).

  o Blocks autophagy (protein degradation).

  o Promotes muscle hypertrophy.

mTORC2:

• Components: mTOR + Rictor + mSIN1 + mLST8.

• Insensitive to rapamycin.

• Responds to: growth factors, stress.

• Functions: organizes the cytoskeleton, activates AKT (cell survival), regulates glucose and lipid metabolism.

• Minor direct role in hypertrophy, but important for muscle endurance and longevity.

In practice, when you talk about "mTOR" in nutrition and training, 99% of the time you are referring to mTORC1.

2. How is mTORC1 activated? (Step-by-step mechanism – 2025 Update)

mTORC1 must reach the surface of the lysosome to be fully activated.

Step 1 – Amino Acid Sensors (Leucine is King):

• Sestrin2 (main leucine sensor).

• SAR1B (another leucine sensor).

• LARS1 (leucyl-tRNA synthetase).

• CASTOR1/2 (arginine).

• SLC38A9 (leucine + arginine from inside the lysosome).

When leucine is sufficient (threshold ~20–40 µM intracellular), Sestrin2 detaches from GATOR2 → GATOR2 stops GATOR1 → RagA/B GTP-ase is activated → mTORC1 is recruited to the lysosome.

Step 2 – Rheb (Last Switch): On the lysosome, Rheb-GTP (activated by insulin/IGF-1 and TSC1/2 inhibition) definitively turns on mTORC1.

Step 3 – Downstream Effectors: mTORC1 phosphorylates:4E-BP1 (eliberarea eIF4E → inițierea traducerii).

S6K1 (p70S6K) → fosforilare S6 ribosomal → sinteză proteică accelerată.

Result: protein synthesis increases by 50–300% for 1–3 hours after a leucine bolus + training.

3. Leucine – The Perfect "Key" for mTORC1 in Muscles

- Leucine is 5–10 times more potent than any other amino acid in activating mTORC1. The minimum dose for maximum activation in humans: ~3 g of free leucine (or ~10–15 g of complete protein). The nano-molecular form from Thot Nutrition is absorbed much faster and reaches the muscles more efficiently, so it activates mTORC1 with lower doses and fewer digestive side effects.
- Recent studies (2024–2025):
- • Leucine + resistance → mTORC1 activated 2–3 hours longer than normal proteins.
- • In people >50 years old, leucine compensates for anabolic resistance and restores the mTOR response to proteins.
- Synergy with the Other Elements of the "Golden Triangle"

4. Creatine: Increases intracellular ATP → reduces AMPK (mTOR inhibitor) → mTORC1 remains active longer.

Caffeine (50–100 mg): Temporarily increases Ca^{2+} and AMPK, but post-workout amplifies fiber recruitment and mTOR signaling.

NO Booster (Citrulline/Arginine): Vasodilation → more amino acids (including leucine) reach the muscles → more mTOR activation.

Isometry (Holding 30–60 s at Maximum Length): Maximum mechanical stress on fast fibers → TSC2 inhibited → Rheb active → explosive mTORC1.

Practical result: the above combo produces a 4–6 hour "anabolic storm" in which protein synthesis is at the level of a young bodybuilder, even at 50+.

5. mTORC1 vs Longevity – The Delicate Balance

It is normal to wonder whether this activation of mTORC1 is beneficial without breaks. So is it okay to push this augmentation and hypertrophy? Answer: NO.

Chronic activation can have harmful effects. (high insulin + non-stop protein + zero fasting) → cancer risk, accelerated aging.

I strive for balance, and any extreme is harmful. THAT IS THE RULE.

That is why biohackers do the following:

• 4-5 days of fasting: You can find detailed links here, or contact me at: https://bralgei.com/postul-negru-secretele-nemuririi-si-biohacking/

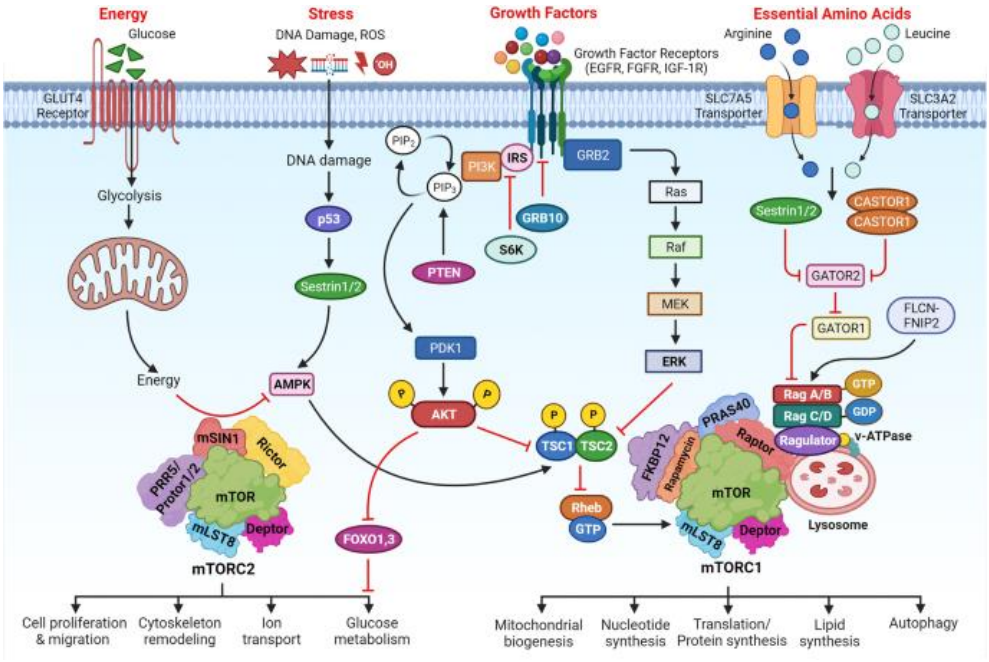
• Leucine reduction or breaks (3–4 g 2–3 times/day, not all the time).

• 14–16 hour intermittent fasting windows (activates AMPK → autophagy).

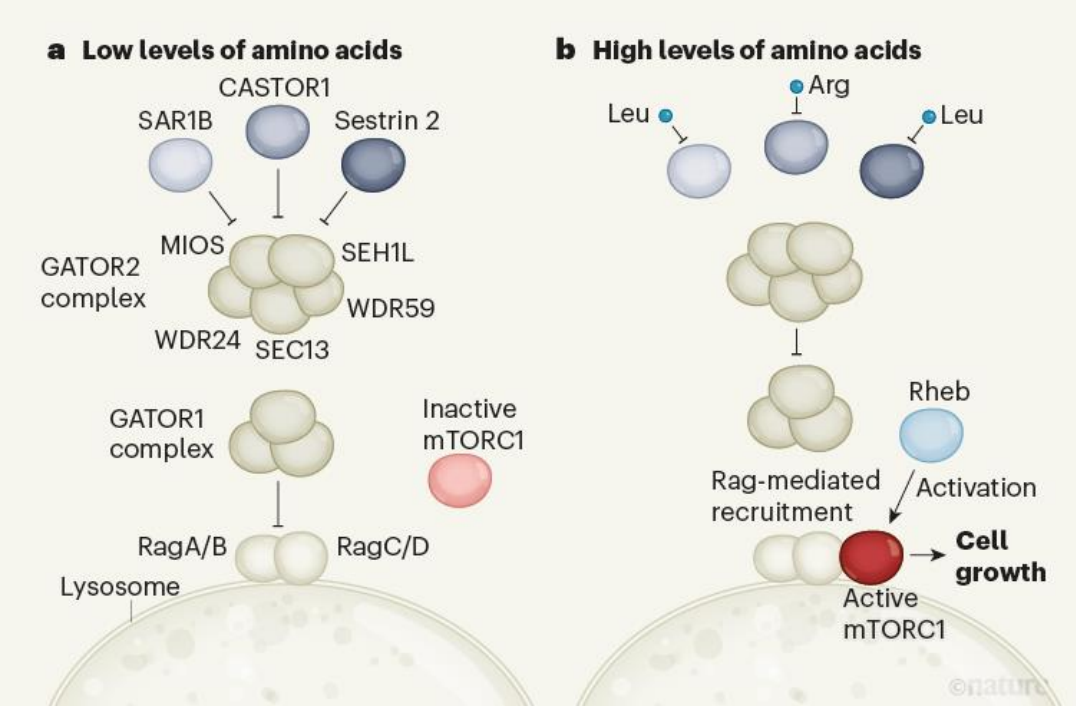
• Occasional rapamycin (small, pulsatile doses) for longevity.

6. Visual Diagrams (The Clearest 2025)

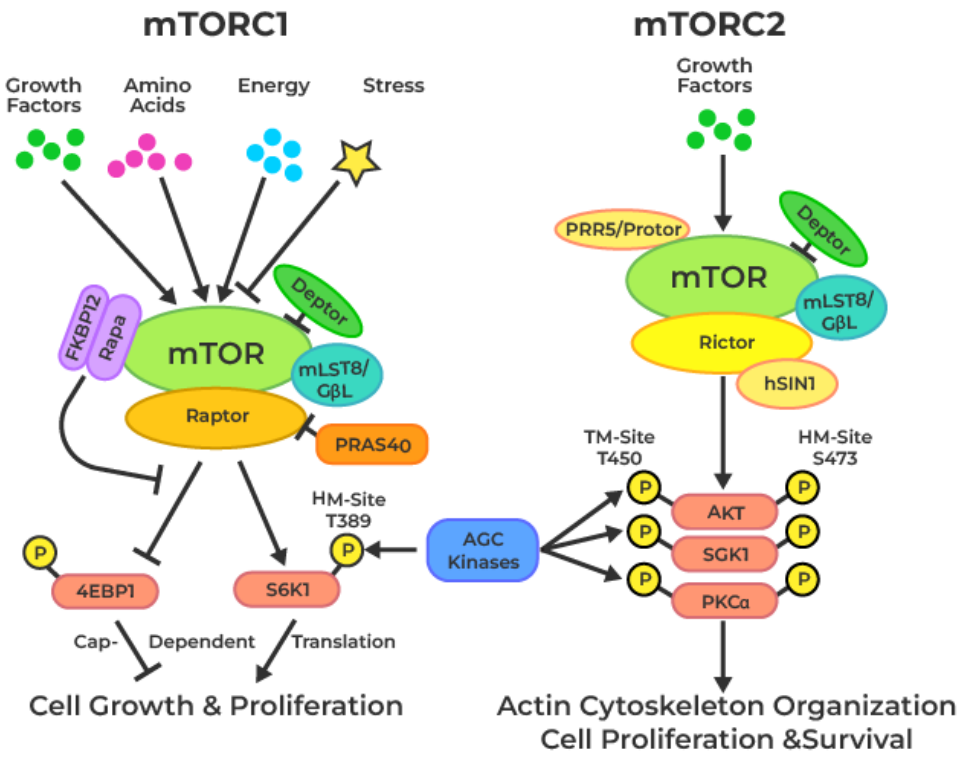
- We have selected the best current schemes:
- The complete Nature 2025 scheme – shows exactly the leucine sensors (Sestrin2, CASTOR, SLC, etc.) and recruitment to the lysosome. Image: image1.png – Placed here for your info.)



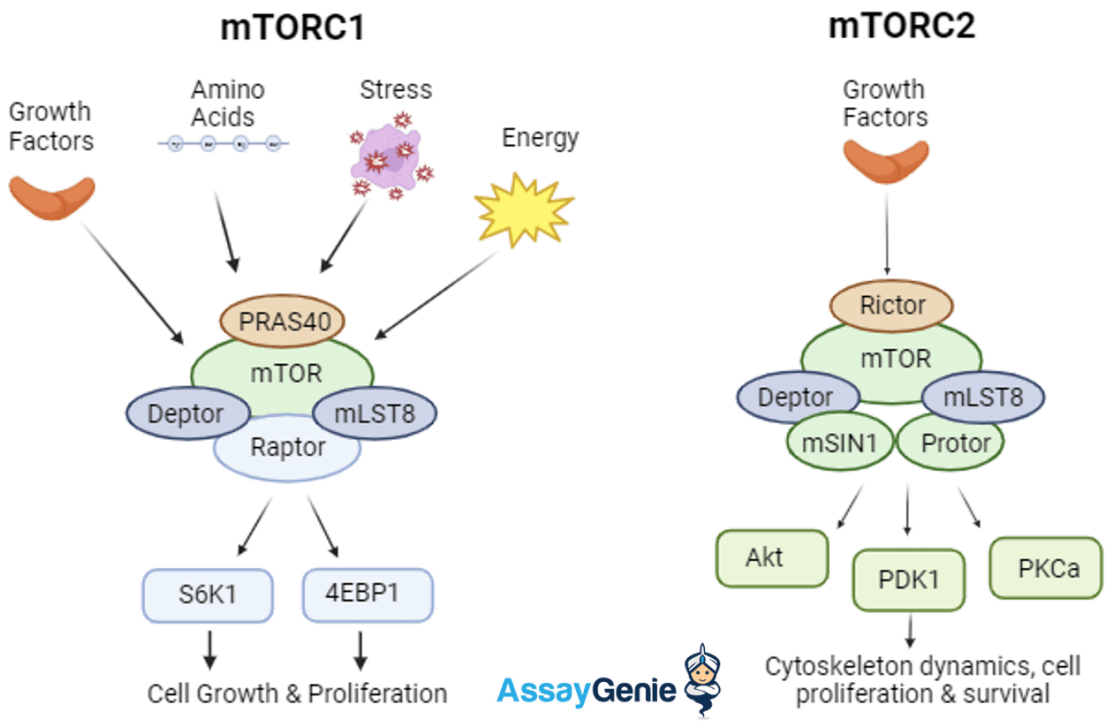
- The precise mechanism of leucine: low vs. high leucine → how Sestrin2 and GATOR2/GATOR1 control Rag GTP-ases. Image: image2.png – Placed here for your info..)



- Simplified version of mTORC1 vs mTORC2 with effectors (S6K1, 4E-BP1, AKT, etc.).[Link: mTOR Signaling Pathway - GeeksforGeeks](Image: image3.png – Placed here for your info..)



- • AssayGenie diagram – very clear for biohackers.Link: Understanding the mTOR Signaling Pathway: A Key Player in Cell Growth and Metabolism - Assay Genie(Image: image4.png – Placed here for your info.)



Practical Conclusion for You

If you want rapid hypertrophy (1–2 kg muscle mass/month at 45–50+ years):

1. 5–10 g nano-molecular leucine (Thot Nutrition) pre- and intra-workout.
2. 15 g creatine (divided).
3. Espresso (50–100 mg caffeine).
4. 3–6 g NO boosters – Nitric Oxide
5. 3–4 intense isometric sessions/week.

This = mTORC1 at maximum + controlled AMPK = accelerated hypertrophy + longevity.

9. Conclusion

Creatine is one of the most well-documented and effective supplements in modern sports nutrition and biohacking, with benefits that go far beyond the classic realm of muscle performance. The monohydrate form remains the top choice for most people—affordable, extremely well-studied (over 1,000 scientific publications), with high bioavailability and consistent results in hypertrophy, strength, recovery, and brain health. The HCL variant is the premium option for those with digestive sensitivity, offering superior absorption and lower doses, without bloating or gastric discomfort.

*What transforms creatine from a common supplement into a true strategic biohacking tool is precisely its customization and optimization:**Doze adaptate individual** (de la 5 g standard la 10–20 g/zi pentru efecte maxime, împărțite pe parcursul zilei).*

- Maximized absorption through simple, proven tricks (hot water 40–50 °C + 0.5–1 g salt + protein/carbohydrate medium from ayran/yogurt).

- Synergistic integration into stacks such as the golden triangle (nano-molecular leucine + creatine + low caffeine + NO booster + isometry), which can double or triple the average muscle growth rate (from 350–400 g/month to 700 g–1.2 kg+), even after decades of inactivity.

- Cognitive and longevity benefits – direct energy for the brain, resistance to mental fatigue, neuroprotection, better mental clarity, and promising effects in aging and menopause.

- Specific benefits for women – accelerated counteraction of sarcopenia, support for bone density through stronger muscles, and improved mood/energy during hormonal transitions.

These approaches debunk many of the old myths in nutrition ("creatine is only for young bodybuilders," "a 3–5 g dose is enough for everyone," "it's not worth taking if you don't do intense sports") and demonstrate that, through controlled experimentation and personalization, results considered "impossible" become reality, even after 50 years of sporadic inactivity.

Final Practical Recommendations

- Start with 5 g/day monohydrate + absorption optimization (ayran/salt/hot water) and monitor for 4–6 weeks.

- If digestive discomfort occurs → switch to HCL 2–5 g/day.

- For accelerated hypertrophy → integrate the golden triangle with increased doses (10–15 g creatine + 5–10 g nano-molecular leucine + short and intense isometry).

- For brain energy and longevity → add 5–10 g/day, especially during periods of stress or poor sleep.

• Always drink 3–4 L of water/day and consult a doctor/nutritionist before taking high doses or if you have pre-existing kidney/liver conditions.

With approaches such as those promoted by myself and Thot Nutrition (leucină nano-moleculară With high-quality ingredients, smart formulations, and a curious experimental mindset, creatine becomes a powerful ally not only for muscles but also for overall vitality, physical independence, and long-term mental clarity. Your personal results—visible muscle reconstruction, increased energy, and demystification of "normal" limits—show that science + smart practice can truly shift those limits.

I have more secrets, but I can't give them all away for free.

For customizations or more detailed protocols, you know where to find me.

10. References

Cymbiotika (2026) on CrM vs. HCL dosing: Acestea sunt articole din blogul Cymbiotika publicate √Æn ianuarie 2026, care comparƒÉ direct creatina monohidrat vs. HCL √Æn termeni de dozare, solubilitate »ôi beneficii:

- https://cymbiotika.com/blogs/fitness-and-recovery/creatine-monohydrate-vs-hcl-understanding-the-differences
- https://cymbiotika.com/blogs/fitness-and-recovery/creatine-monohydrate-vs-hydrochloride-which-is-better-for-you
- https://cymbiotika.com/blogs/fitness-and-recovery/creatine-hcl-vs-monohydrate-unpacking-performance-fuel (Several similar variants from the same source, all from 2026, focusing on dosage and practical differences.) Jinfiniti (2025) on absorption and efficacy: Articles from Jinfiniti (a website specializing in longevity and supplements) from 2025, discussing absorption, efficacy, and dosage guidelines for creatine:
- https://www.jinfiniti.com/creatine-starter-guide-loading-timing (2025 guide on loading, timing, and absorption)
- https://www.jinfiniti.com/micronized-creatine-vs-monohydrate ((2025 guide on loading, timing, and absorption)
- https://www.jinfiniti.com/best-creatine-supplements (review 2026 with references to meta-analyses 2025 on efficacy) These cover the topic of absorption and overall efficacy well.
- PMC studies on cognitive benefits (2024): Open-access studies from PMC (PubMed Central) from 2024 on the cognitive benefits of creatine:
- https://pmc.ncbi.nlm.nih.gov/articles/PMC11275561/ (systematic meta-analysis 2024: positive effects on cognitive function in adults)

- https://pmc.ncbi.nlm.nih.gov/articles/PMC11574456/ ((systematic meta-analysis 2024: positive effects on cognitive function in adults)
- https://pmc.ncbi.nlm.nih.gov/articles/PMC12395611/ (2024 study on high doses and cognitive function) These are the main ones from 2024 focusing on cognition.

• MDPI on women's health (2021–2025 updates): Articles from Nutrients (MDPI) on creatine and women's health, with updates until 2025:

o https://www.mdpi.com/2072-6643/13/3/877 (2021 review: lifespan perspective, including menopause and performance)

o https://www.mdpi.com/2072-6643/17/2/238 (2025 systematic review: performance in active women)

o https://www.mdpi.com/2072-6643/15/16/3567 (2023 study on recovery in the menstrual cycle)

o https://www.mdpi.com/2072-6643/16/16/2772 (2024 study on sleep and training in women) These cover the evolution of the topic from 2021 to 2025.

• Systematic reviews on muscle gain (2020–2025): Recent meta-analyses and systematic reviews on muscle gain with creatine:

o https://pubmed.ncbi.nlm.nih.gov/37432300/ (2023: effects on regional hypertrophy with RT)

o https://pmc.ncbi.nlm.nih.gov/articles/PMC8949037/ (scoping review 2022: RCTs 2012–2021 on muscle growth)

o https://www.mdpi.com/2072-6643/16/21/3665 (meta-analysis 2024: strength gains in adults <50 years old)

o https://www.mdpi.com/2072-6643/15/9/2116 (meta-analysis 2023: hypertrophy with RT) These are representative for the period 2020–2025.