Air National Guard

Integrity - Service - Excellence

Supplements in Primary Care



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Chad Asplund, MD, MC, FS
Chief, Aerospace Medicine
Air National Guard
Past President, AMSSM
Trustee, ACSM



Chad Asplund, MD

- Has no relationships to disclose.

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The patient…

- A 40 yr old active adult, works a professional job, has been seeing ads for various supplements on social media that promise to transform his body from a “dad bod” to a “ripped bod”
- Has a bag full of supplements that he brings in
- Wants to know what you think, which ones are safe, which ones he should take



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Objectives

- At end of presentation, you will be able to:
  - Evaluate common supplements
  - Identify risks
  - Counsel active adults safely



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Supplement Industry

- US dietary supplement market = $69 billion in 2025 projected to reach over $130 billion by 2035
- Vitamins 28%
- OTC supplements 75%
- Consumers proactively seeking ways to boost immunity, improve mental well being, manage stress, and support overall health
- Nutraceuticals are emerging as next line

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Common Supplements

- Key supplements and types
  - Multivitamins (71% of users)
  - Vit D and Ca++ (32%)
  - Omega 3/Fish Oil (33%)
  - Vitamin C (32%)
  - Botanicals/herbs
  - Specialty (Protein/amino acids, probiotics, melatonin)

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Regulation

- FDA does not regulate
- Dietary Supplement Health and Education Act (DSHEA) – supplements = food not meds – is not adequate
- High levels of contamination
  - FDA identified 746 supplements contaminated by pharmaceutical [JAMA 2018]
- Approx 23,000 ER visits per year for supplement reactions [NEJM, 2015]

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So…why supplements

- Improved performance and recovery…
- Only marginal gains when compared to:
  - Sleep
  - Nutrition
  - Hydration
  - Proper training
- But…can patients still benefit from supplements?

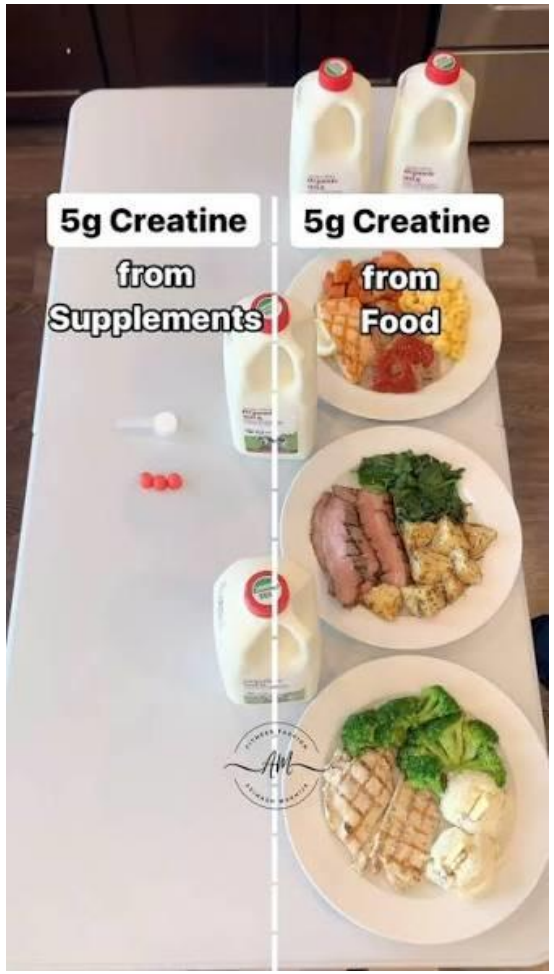
Evidence Based Supplements – the core 4

- Creatine
- Protein
- Caffeine
- Omega 3's



Creatine

- Most rigorously studied supplement
- Primary benefits:
  - Muscle strength/power/lean mass [Longevity, 2026]
    - [J Strength Cond, 2024]
    - [Nutrients, 2025]
  - Prevents sarcopenia [Nutrients, 2023]
    - [Zhang, 2025]
    - [Nutrients, 2021]



Creatine

- Secondary benefits:
  - Bone health [Longevity, 2026]
  - Cognitive enhancement [GSSI, 2023]
    - [Xu, 2024]
    - [Propdokis, 2023]
    - [Sandkuhler, 2023]
  - Mood support/resiliency [JISSN, 2025]
  - Neuroprotection [Health.mil, 2025]
- Risks?
- Overall, very low risk [Harvard Health Study]

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Creatine - specifics

- Dosing:
  - Maintenance: 3-5 g daily
  - Loading phase: 20 g daily x 1 week
  - Brain saturation: 10-20 g daily – still under study

- Kidney safety: Large meta-analysis of 21 studies confirmed no adverse effects (in healthy adults)

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Who should take?

- Almost everyone can benefit from regular creatine supplementation (3-5 g/day dose)
  - Endurance athletes, vegetarians, adults > 50, cognitive protection, strength athletes

- Only groups that shouldn't use:
  - CKD/polycystic kidneys, uncontrolled HTN, pregnancy, on multiple nephrotoxic meds

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Form of creatine…does it matter?

- Cr monohydrate is the gold standard
- The most widely researched, highly recommended, and cost-effective form.
- Creatine ethyl ester (CEE), creatine hydrochloride, buffered creatine, liquid creatine, creatine magnesium chelate (CMC) – studies not superior to Cr Mono



NSF CERTIFIED SPORT

Protein

- Primarily used to facilitate muscle protein synthesis, accelerate recovery, preserve lean muscle mass
  - Efficient and highly bio-available
- NO BENEFIT FROM SUPPLEMENTATION IF ALREADY MEETING PROTEIN NEEDS FROM DIET [JISSN, 2024]
  - RDA: 0.8 g/kg, Active or elderly 1.2 – 1.5 g/kg
  - High level active/strength athletes 1.4 – 2.0 g/kg
  - Calorie deficit 1.8 – 2.2 g/kg
  - GLP 1 1.6 – 2.2 g/kg

Protein

130G Protein (80kg x 1.6g/kg)



150G protein (80kg x 1.9g/kg)



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Are there differences in type?

📊 PROTEIN TYPE COMPARISON TABLE

Attribute	Whey Isolate $54.99•DICK'S Sporting Goods	Whey Concentrate $76.39•Optimum Nutrition	Egg Protein $59.99•Legion Supplements	Plant Protein (Pea/Blend) $114.77•ALLMAX
Protein % (per scoop)	~90%+	~70–80%	~80–85%	~70–80%
Amino acid quality	⭐⭐⭐⭐⭐	⭐⭐⭐⭐	⭐⭐⭐⭐⭐	⭐⭐⭐⭐
Leucine (muscle trigger)	High	Moderate-high	High	Moderate
Digestibility	⭐⭐⭐⭐ (low lactose)	⭐⭐⭐ (more lactose)	⭐⭐⭐⭐	⭐⭐⭐⭐⭐
Lactose-free	Yes (mostly)	No	Yes	Yes
Absorption speed	Fast	Medium	Medium	Medium
Muscle building effectiveness	Best	Very good	Very good	Good
GI tolerance	Good	Variable	Good	Best
Cost	Medium	Low	High	Medium
Best use case	Performance & recovery	Budget protein	Dairy-free high quality	Vegan / sensitive gut

Caffeine

- Well studied supplement with proven performance effects
- General:
  - Vigilance, reaction time, memory/learning, mood regulation
- Athletic:
  - Endurance: Increase usage of FFA, sparing glycogen
  - Strength/power: Enhances motor unit recruitment
  - Pain tolerance: Attenuates central perception of pain
  - Fat oxidation: Increases metabolic rate and thermogenesis

When/How to Use?

- Std performance: 3-6 mg/kg 45-60 min prior to exercise
- Sustained vigilance 100-200mg every 3-4 hours
- Rapid alertness 100mg caffeine gum

- Starbucks Venti – 400mg
- Celsius/Bang – 200-300mg
- Std coffee 150-200mg
- Monster – 160mg
- Red Bull – 80mg
- Mt Dew – 55mg
- Caffeine Gel – 50mg

Best effect in caffeine naïve or those that wean off caffeine before event

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Nappuccino



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Side Effects – who shouldn't use

- **Side effects**
  - **Anxiety/jitters**
  - **Tachycardia**
  - **GI hypermobility/reflux**
  - **Mild diuresis**
- **Shouldn't use**
  - **CV condition**
  - **Severe anxiety**
  - **Active PUD**
  - **Stimulant meds**
  - **Prone to heat illness**

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Omega 3's

Benefit	Impact	Mechanism	Reference
Neuroprotection	Enhances resilience/recovery TBI	DHA is primary structural fat in brain – high levels reduce neuroinflammation after injury	Nutrient, 2024 JISSN, 2021 Nutr Neuro, 2024
CV Health	Lower TG, improves HRV	Reduces arterial plaque and stabilizes heart rhythm under stress	Cochrane, 2018
Inflammation control	Accelerates recovery, reduces joint pain	Competes with pro-inflammatory Omega 6	
Cognitive function	Maintains focus, memory, exec function	Potent treatment for depression	BJN, 2024
Visual acuity	Protects retinal health and low light vision	DHA highly concentrated in retina	

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Omega 3's dose

- Baseline gen health: 500-1000mg
- Athletic Performance: 1500-2000mg
- Intense exercise recovery: 2000-3000mg
- Cognitive support: 1000-2000mg
- Neuroprotection (high risk): 3000+ mg

- To optimize absorption
  - Eat with fat – inc abs by 300%
  - Split dose AM/PM
  - Check for oxidation – may promote inflammation

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Are O3 supplements better than diet?

- **Heavy metal trade off**
  - **To get O3 from fish – may be exposed to mercury/PCB**
- **Caloric efficiency**
- **EPA/DHA trade off – Olive Oil/Nut issue**
  - **Direct EPA/DHA – no conversion process**
- **SMASH diet: sardines, mackeral, anchovies, salmon, herring**
- **Olive oil**
- **Supplementation = force multiplier**

Omega 3 supplements – which better

- **Krill oil vs. fish oil**

Krill Oil - ADV	Fish Oil - ADV
Better absorbed	Cost effective
No fish burps	More concentrated EPA/DHA density
High water solubility	More research
Astaxanthin – potent antioxidant	
Choline content	
Sens stomach, baseline maintenance	High risk role, high dose neuroprotection, sustainable cost

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Who shouldn't supplement Omegas

- **Severe bleeding disorders – anti-platelet effect**
- **Having surgery soon – anticoagulant properties**
- **High dose anti-coagulants – anti-plateley effect**
- **Fish/shellfish allergies – potential for anaphylaxis**
- **May increase Afib risk – high doses may increase Afib risk**
- **Compromised immune system – high doses may suppress inflammatory response**

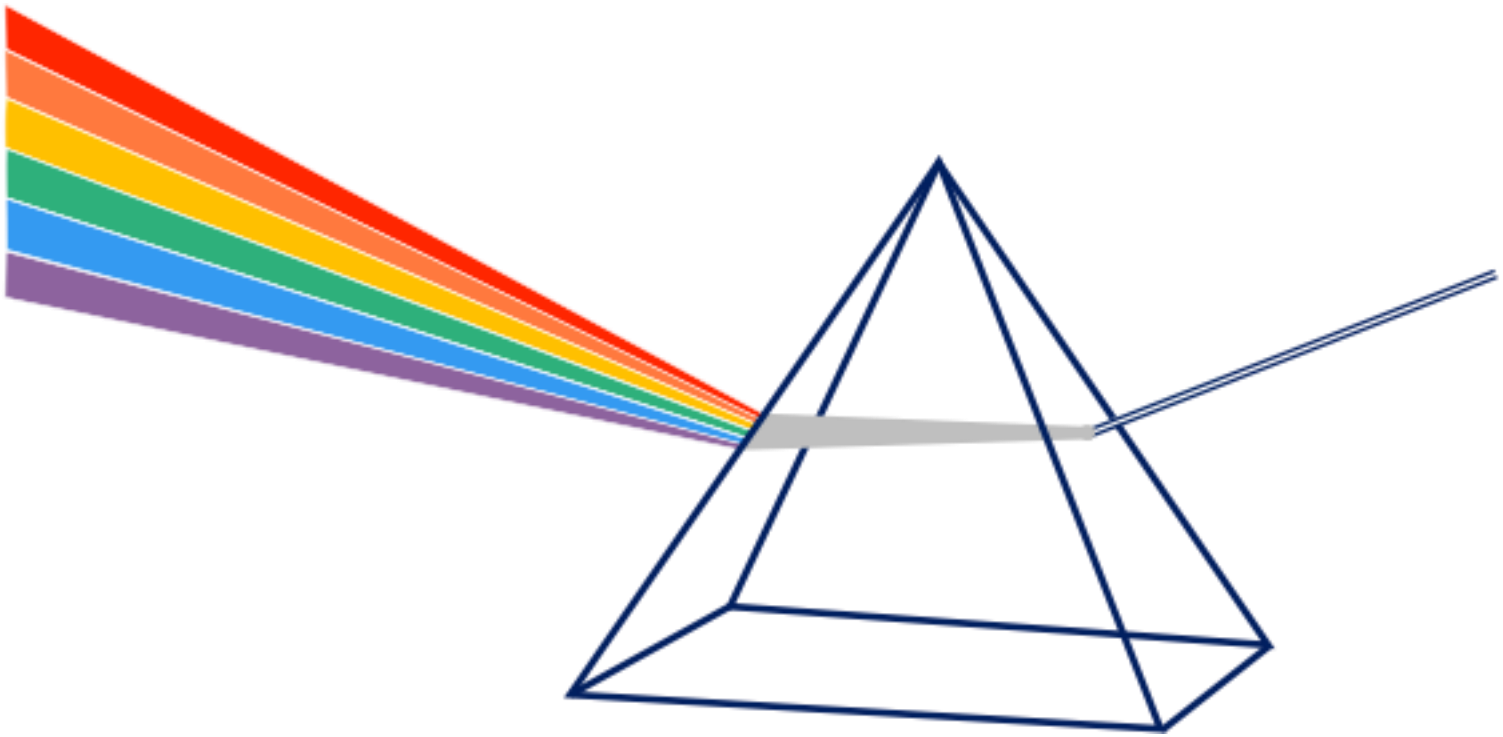
The Core 4

- For most individuals, the Core 4 should be considered “base-layer” supplements
- Unless you fall into one of the specific “do not take” categories, most people will benefit from the Core 4
- Exception: Many people will meet protein goals with diet alone and caffeine should be used strategically

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Mixed Evidence Supplements

- Collagen
- Magnesium
- Vitamin D



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Collagen Peptides

Benefit	Impact	Level of Evidence
Joint Pain Reduction	Decreases activity related pain	High
Connective Tissue Repair	Accelerates healing of tendon and ligament injuries	Moderate/High
Skin Health	Improves skin elasticity, hydration and wound healing	High
Bone Mineral Density	May slow bone loss	Moderate
Gut Lining Support	Anecdotal support for leaky gut	Low

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Magnesium

Benefit	Impact	Level of Evidence
Muscle Cramp Relief	Involuntary spasm, night cramps	Proven effective particularly in athletes and pregnancy
Exercise performance	Improves strength and power output	Enhances glucose availability to brain/muscles
Muscle Soreness	Reduces DOMS	2025 Sys Review: Protects against certain markers of muscle damage
Bone Density	Prevents fractures	Approx 60% of bodily Mag stored in bones, essential for activity of Vitamin D and Ca++ absorption
Sleep	Supports activity of GABA	Reduce amt of time to fall asleep and improves REM architecture

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Magnesium and Sleep

- Improves sleep latency, duration and efficiency [MSSE, 2023]
  - [Nat Sci Sleep, 2025]
- Improves sleep quality and elevates mood [Med Res Arch, 2025]



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Different forms of Magnesium

- Glycinate: Best absorbed, gentle on stomach, calming effect
- Threonate: Only form proven to cross blood/brain barrier
- Citrate: Mild laxative
- Malate: Good for chronic fatigue
- Taurate: Cardiovascular support
- Oxide: Worst absorbed, laxative

Vitamin D

Benefit	Impact	Evidence	Reference
Immune Readiness	Decreases URI	2024 Meta-analysis – lowers risk of URI	BMJ 2017
Skeletal Integrity	Prevents stress fractures	Gatekeeper for calcium absorption	J Bone Min Res, 2008 J Bone Min Res, 2011
Muscle Power	Supports testosterone production	Vit D receptors are on mucles cells	BJSM, 2013
Hormonal Health	Supports testosterone and metabolic rate	Correcting deficiency improves Free T	Hormone Met Res, 2011
Cognitive Health/Mood stability	Supports mood stability and protects against Seas Aff Disorder	Low levels Vit D assoc with increase risk of depression	Nutrients, 2022

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Bottom Line on Mixed Evidence Supplements

- Vitamin D highly recommended for those in higher Northern latitudes or those that spend most of day inside
- Magnesium recommended for those with sleep issues or night cramps
- Collagen can be considered optional – but may be helpful in ligament, tendon healing post injury

Risky or Ineffective

- Testosterone Boosters
- Peptides
- Fat Burners



Testosterone Boosters

- Tribulus terrestris
- D-aspartic acid (DAA)
- Fadogia Agrestis
- ZMA (zinc/mag/B6)
- Fenugreek



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Dangers of Testosterone Boosters

- Contamination/Banned Substance Risk
  - Ind 2024-2025 analysis >25% contained anabolic steroids not listed
- Hepatotoxic
- Hormonal suppression/rebound
- Cardiovascular strain
  - Stimulant illusion

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Peptides

Peptide	Primary Mechanism	Claimed Benefit	Evidence Level/Current Status
BPC-157	Accelerates angiogenesis and upregulates GH receptors	Rapid healing of tendons/ligaments	Strong animal data – NO HUMAN DATA – Banned by WADA
TB-500	Regulates actin, promotes tissue repair	Often stacked with BPC-157 for muscle repair	Strong animal data – used extensively in horse racing. NO HUMAN DATA – Banned by WADA
CJC-1295	Growth hormone secretagoguge	Enhances sleep, accelerating recovery	Moderate human data – safer than HGH but regulated. Banned by WADA
Semax/Selank	Neuropeptides	Neuroprotection, extreme stress buffering	Moderate clinical data – Russia – not approved in US

BPC-157



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BPC-157

- Body protective compound – 157
- “Wolverine”
- Promotes angiogenesis
- May be great for tendon healing



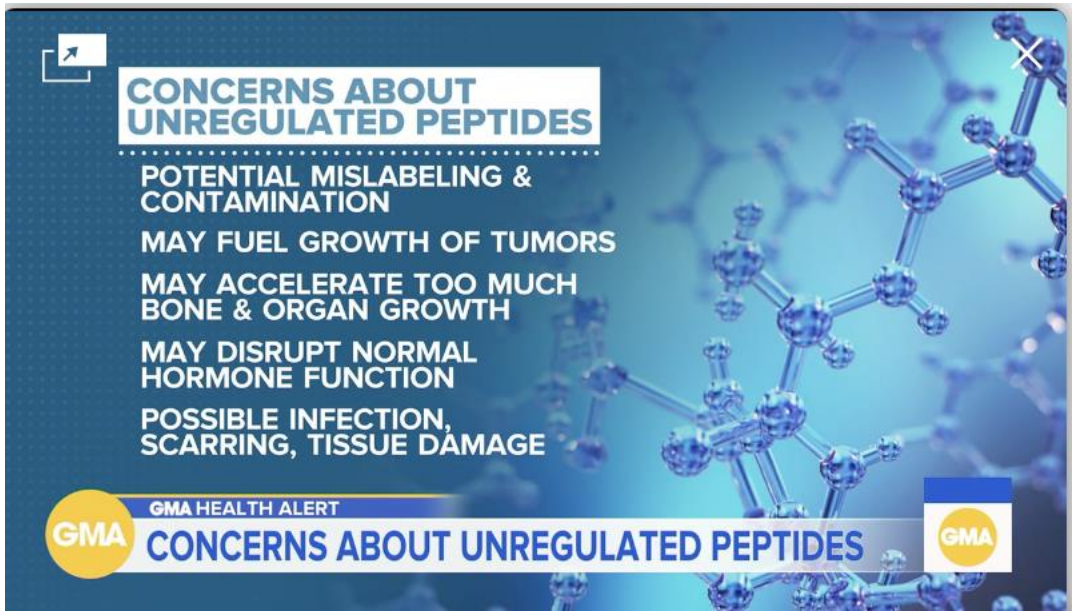
- Theoretical concern could inadvertently accelerate the growth of existing, undetected tumors

- While BPC-157 represents a massive leap forward in the concept of regenerative medicine – experimental, unsupported, banned substance [Curr Rev Musk Med, 2025]

BPC 157

FDA advisory committee votes to add popular peptide BPC-157 to drug compounding list

- July 2026, FDA Advisory Committee (8-6) voted to recommend allowing specialty compound pharmacies to produce unapproved peptides: BPC-157, TB-500, KPV, MOTS-C



BPC-157

- **Animal data (56 studies):**
- Accelerated tendon healing
- Improved ligament healing
- Faster muscle recovery
- Enhanced wound healing
- Gastrointestinal protection
- Angiogenesis (new blood vessel formation)



BPC-157

- There are no large randomized controlled trials demonstrating efficacy for tendon, ligament, muscle or sports injury in humans
- WADA banned substance
- Published studies:
- 1 human clinic trial n=2, 10 day, assess safety of IV infusion of BPC [Altern Ther Hum Med, 2025]

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Fat Burners

- Caffeine
- Yohimbine/alpha-yohimbine
- Synephrine
- Green Tea Extract
- L-Carnitine

- Increase heart rate, core temp
- May contain hidden stimulants: DMAA, DMHA, sibutramine
- Liver Damage
- Panic Attack/Jitters

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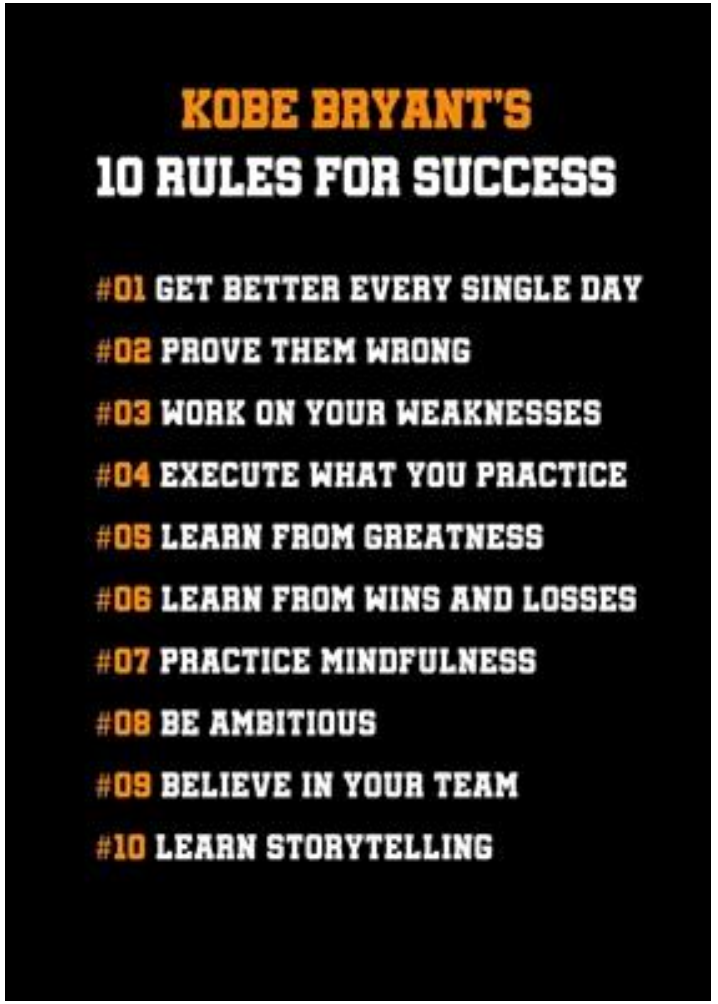
What do we know?

- Core 4 supplements well studied and efficacious – should be considered by most people
- Mixed Evidence – beneficial for those with specific conditions
- Risky – should be avoided due to poor evidence and high risk



Mindfulness

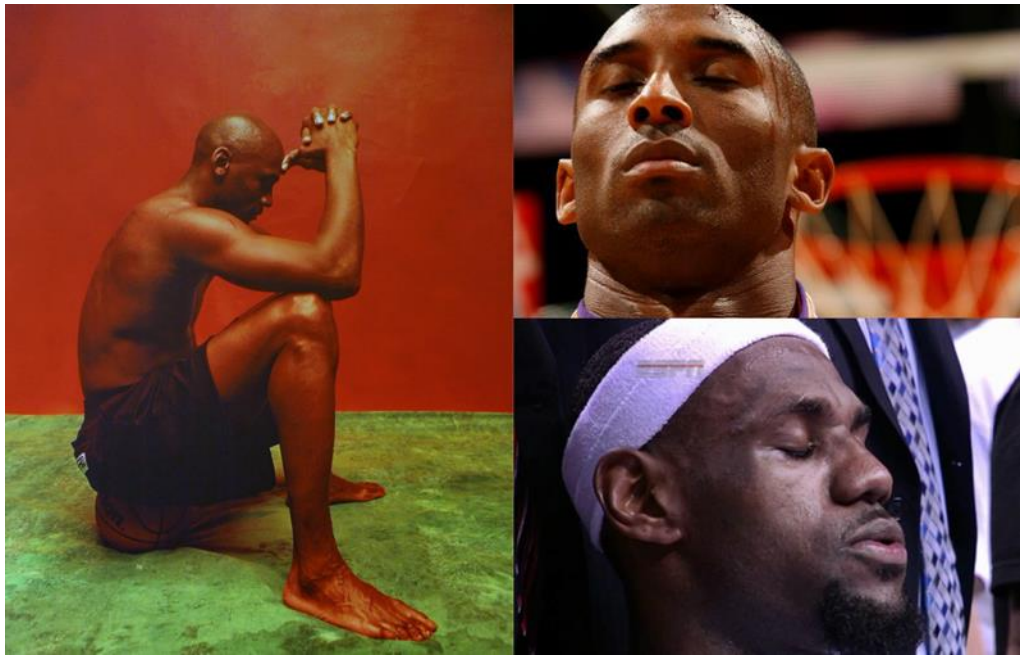
- Mindfulness means paying attention to the present moment, without judging or trying to change it. This involves observing your thoughts, feelings, and sensations without getting caught up in them.



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Benefits of Mindfulness

- Reduces chronic stress and lowers cortisol levels
- Associated with improved blood pressure and cardiovascular health
- Improves sleep quality and emotional regulation
- Enhances attention, resilience, and cognitive performance
- Linked to lower inflammation markers and improved immune function
- May contribute to healthier aging and increased health span



Annu Rev Psychol. 2017.
JAMA Intern Med. 2014.
Ann NY Acad Sci. 2016.

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Evidence and Practical Application

- Mindfulness-based stress reduction (MBSR) programs improve anxiety, depression, and chronic pain outcomes
- Meditation studies demonstrate structural and functional brain changes related to attention and emotional control
- Regular mindfulness practice is associated with improved autonomic balance and reduced sympathetic activation
- Even 10–15 minutes daily can provide measurable psychological and physiologic benefits

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Questions?

