

Nutrition Issues in Performing Artists: Problems and Solutions

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Nutrition for Performing Arts Class

Emory University (Only class of its kind on the planet)

Guest performing artists: Classical and Jazz Instrumentalists, Singers, Dancers, String Ensembles, and Actors.



David Coucheron-Violinist



Lucia Gonzales-Ballet Dancer



Desiree Nathanson-Dance and Actress



AJ Neibel-National Ballet



Vega Quartet



Julie Coucheron-Pianist



Natalie Delancey-Executive
Director-City Springs Theatre
Company



Bethany Grace Mamola-Soprano



John Martin-Classical Guitar

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Common Nutrition Issues Observed in Performing Artists

- Failure to Sustain Energy Balance
- Poor Hydration Strategies
- Excess Focus on Body Weight Rather than Body Composition
- Over-Reliance on Vitamin and Mineral Supplementation
- Excess Focus on Protein with Failure to Understand How Best to Consume It.
- Nonexistent Recovery Strategy Following Performance/Rehearsal
- Work Environments That May Contribute to Nutritional Issues
- Excess Focus on 'Good Foods', Inhibiting Dietary Variety.



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10 Things To Know About Nutrition for the Performing Arts

- 1.** Look Beyond Weight When Determining Health



- 2.** Building Muscle Takes More Than Just Protein



- 3.** Protein: It's Not Just More, But When and How Much



- 4.** Infrequent Meals Cause Problems



- 5.** Fresh foods help the microbiome keep you healthy



- 6.** Good Food, Bad Food, Wrong Choice



- 7.** Relative Energy Deficiency in Sport (RED-S) can be a Problem



- 8.** Poor Hydration, Poor Performance



- 9.** Recovery from Exercise is Just as Important as the Exercise



- 10.** It Is Important to Learn How to Lower Stress



- Do Better
- Feel Better
- Stay Healthier
- Enjoy Life

* * *

Source: Benardot D. Ten things you need to know about nutrition. (Sharable Resource). [ACSM's Health & Fitness Journal](#). 2025; July/August: 74.

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Issue 1: Failure to Sustain Energy Balance

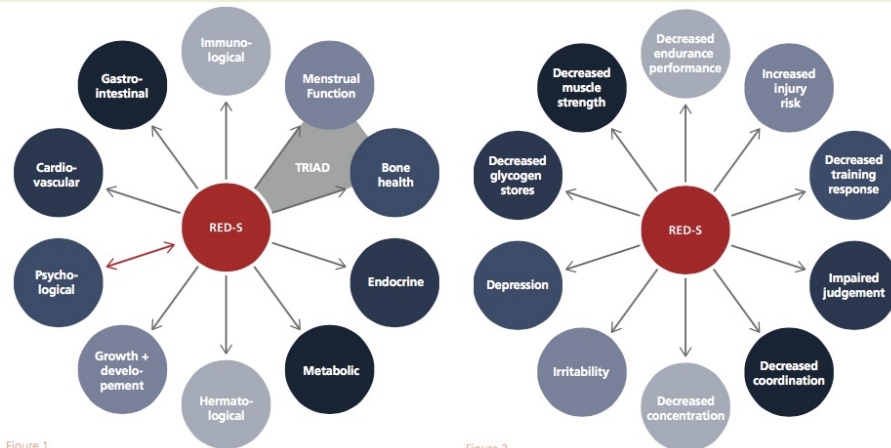


Figure 1

Figure 2

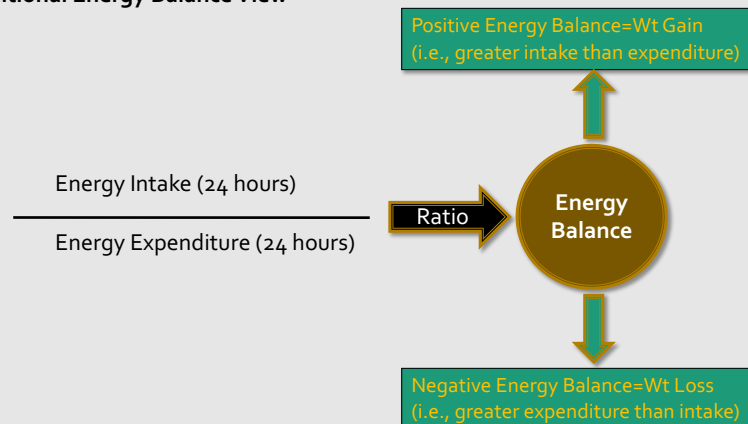
Margo Mountjoy, Jorunn Sundgot-Borgen, Louise Burke, Susan Carter, Naama Constantini, Constance Lebrun, Nanna Meyer, Roberta Sherman, Kathrin Steffen, Richard Budgett, Arne Ljungqvist. *Br J Sports Med* 2014;48:491–497. doi:10.1136/bjsports-2014-093502 (Now with 2018 Update)

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REAL TIME DELIVERY IS KEY

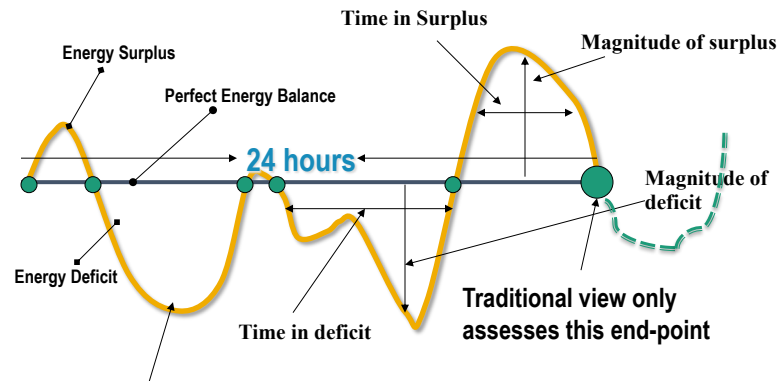
Macroeconomic View of Energy Balance (...and the basis for most weight loss programs)

Traditional Energy Balance View



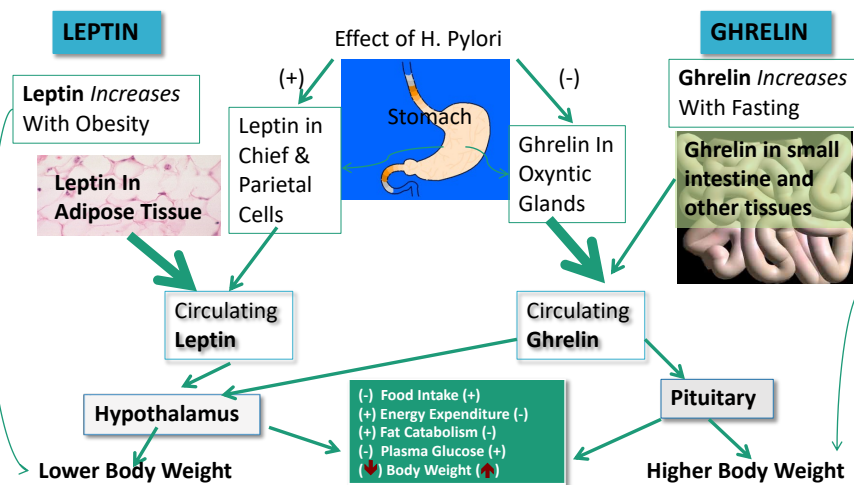
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Micro-Economic View of Energy Balance (Within-Day Energy Balance)



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Energy Balance Feedback Mechanisms Following Leptin and Ghrelin



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- **Decreased Meal Frequency...**

- Correlates with greater daily energy

In simple terms:

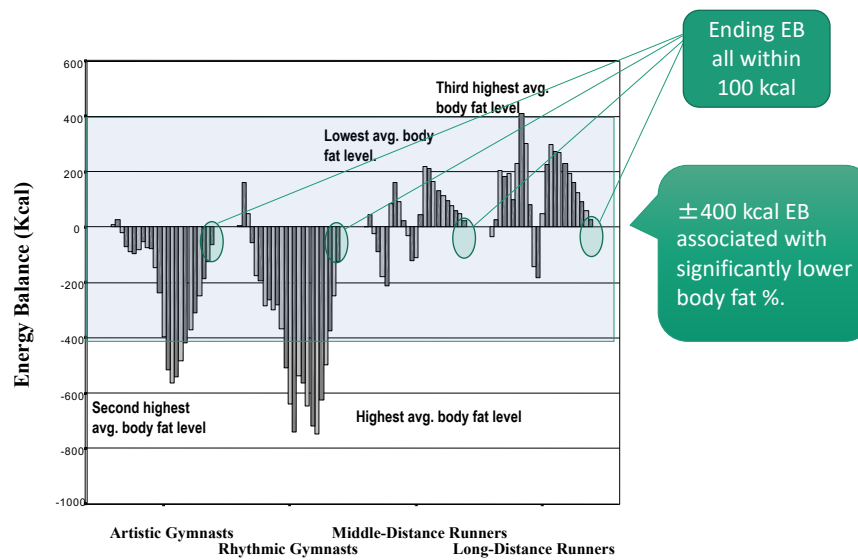
1. Eating when energy balance is below -300 to -400 kcal (depending on body size) will result in a hyperinsulinemic response to the consumed food, regardless of what is consumed.
2. Ghrelin is only shut off with a normal insulin response to eating, so more food (i.e., more kcal) is consumed because ghrelin stays elevated.
3. Insulin is produced exponentially to the kcal consumed.
4. Excess fat storage is inevitable with this eating behavior.

- Andersson et al., *Diabetes*. 2005
- Solomon et al., *British Journal of Nutrition*. 2008

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Within Day Energy Balance and Body Composition.

Deutz B, Benardot D, Martin D, and Cody M. Relationship between energy deficits and body composition in elite female gymnasts and runners. *Medicine & Science in Sports & Exercise*. 2000; 32(3): 659-668.



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Snack Study

Benardot D, et al. *Med Sci Sports Exer*, 2005; 37(5): S339.

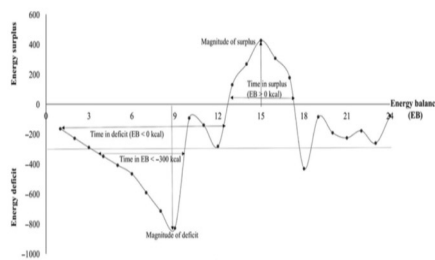


Measured at each assessment opportunity (Results: Group provided calories)

- Body composition (DEXA) _____ Significantly lower body Fat %
- IGF-I (Fasting) _____ Higher trend (non-signif. $p=.08$)
- POMS _____ Significantly more vigorous
- Performance (Wingate) _____ Significantly better power & endurance
- Diet and Energy Balance _____ No change in calories (Wt Stable)

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Food Intake and Energy Expenditure



Recent studies suggest that assessing within-day energy balance provides useful performance- and health-based information for active people... More time in a severe energy balance deficit results in:

- **Females:** Significantly higher cortisol and significantly lower estrogen, even when in 24-hour energy balance.
- **Males:** Significantly higher cortisol and significantly lower testosterone:cortisol ratio, even when in 24-hour energy balance.

- Relative energy deficiency and stress fracture risk.
- Dehydration and muscle injury
- Prolonged muscle soreness from poor post-exercise nutrition (fluids, protein, carbohydrate)
- Inflammatory fat (O6) consumption and greater muscle inflammation with poor recovery/repair

*Fahrenholtz IL, Sjödin A, Benardot D, Tornberg ÅB, Skouby S, Faber J, Sundgot-Borgen J, and Melin A. Within-day energy deficiency and reproductive function in female endurance athletes. *Scandinavian Journal of Medicine & Science in Sports* 2018: 1-8 doi: 10.1111/sms.13030

*Torstveit MK, Fahrenholtz I, Stenqvist TB, Sylta Ø, and Melin A. Within-day energy deficiency and metabolic perturbation in male endurance athletes. *International Journal of Sport Nutrition and Exercise Metabolism* 2018: DOI: <https://doi.org/10.1123/ijsem.2017-0337>

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Issue 2: Poor Hydration Strategies

The Goal Should be to Sustain Normalcy Rather Than to Recover from Abnormalcy (i.e., Thirst).

The Good, The Bad, and the Ugly

- **The Good:** Consumption of the right amount of the right fluid at the right time.
- **The Bad:** Consumption of some fluids of questionable value at any time.
- **The Ugly:** Forget the fluids, I'm just going to drink something when I eat.

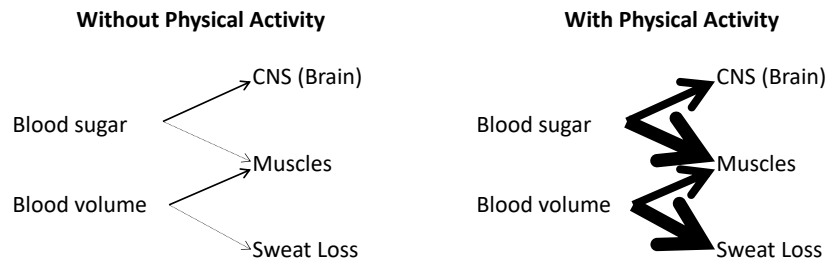
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Fluids and Electrolytes

- Primary aim of fluid replacement is to maintain plasma volume so that circulation, stroke volume, and sweating progress at optimal levels.
- To obtain high rate of gastric emptying, the stomach should remain partially filled with fluid and, ideally, the ingested fluid should be at the relatively cold temperature of 41 degrees F
- Performing artists involved in long-term rehearsals generally replace only a fraction of their fluid sweat loss

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What Happens With Physical Activity?



The single biggest factors associated with the maintenance of physical and mental performance is the maintenance of **blood volume** and **blood sugar**. Low blood volume results in a faster heart rate because of a reduced stroke volume. Blood sugar is the primary fuel for the neurological system. Low blood volume and low blood sugar are both interpreted by the brain as a stress reaction.

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Concentrations of Electrolytes in Sweat, Plasma and Intracellular Water

Source: Maughan RJ. Fluid and electrolyte loss and replacement in exercise. In: "Oxford Textbook of Sports Medicine (eds. Harries M, Williams G, Stanish WD & Micheli LL) New York: Oxford University Press © 1994, pp 82-93.

	Sweat (mmol·l ⁻¹)	Plasma (mmol·l ⁻¹)	Intracellular Water (mmol·l ⁻¹)
Sodium	20-80	130-155	10
Potassium	4-8	3.2-5.5	150
Calcium	0-1	2.1-2.9	0
Magnesium	<0.2	0.7-1.5	15
Chloride	20-60	96-110	8
Bicarbonate	0-35	23-28	10
Phosphate	0.1-0.2	0.7-1.6	65
Sulphate	0.1-2.0	0.3-0.9	10

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Frequently Drinking Just Water Elevates the Risk of Hyponatremia

- Are on a low-sodium diet
- Drink water or other no-sodium beverages during exercise
- Aren't acclimated to the environment they are rehearsing or performing in or are poorly trained
- Take NSAIDs



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Issues In Performing Artists

• Physical Activity...

- Increases *rate* of **carbohydrate** utilization
- Increases *rate* of **water loss** via sweat
- Increases *rate* of **salt loss** via sweat

HOWEVER, MANY PERFORMING ARTISTS JUST DRINK WATER DURING REHEARSALS.

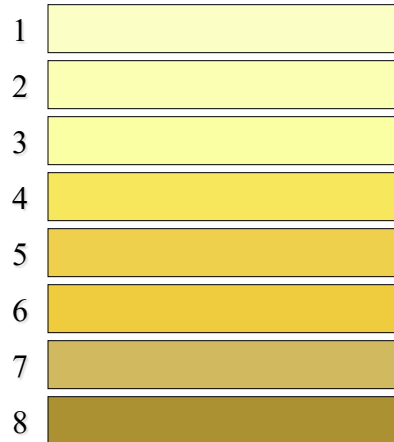
IN WHAT UNIVERSE DO YOU LOSE 3 THINGS AND ONLY REPLACE 1???

How much fluid do you need?

Know pre-rehearsal weight and post- weight. 16 oz = 1 lb.
Try to avoid losing more than 2% of pre-rehearsal weight, as this level of dehydration is associated with poor performance and elevated injury rate.

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Hydration & Rehydration



- Urine Color Chart
- Assess Hydration
- 1, 2, or 3: Well Hydrated
- 7 or Darker: Dehydrated

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Common Risks for Dehydration

- Vomiting
- Diarrhea
- Inadequate fluid replacement
- Induced high sweat rates (as in saunas)
- Laxatives
- Diuretics (and substances with a diuretic effect, such as high intakes of caffeine/beverages)
- Dieting
- Febrile illness

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Fluid Guidelines from ADA, ACSM and Dietitians of Canada

- Before
 - Drink 12 to 20 oz (400-600 ml) 2-3 hours before activity
- During
 - Drink 6 to 12 oz (150-350 ml) every 15-20 minutes
- After
 - Replace 150% of sweat losses
 - Drink 3 cups (24 oz) for every 1 lb weight lost through sweat

LEARN TO SIP ON FLUIDS REGULARLY, RATHER THAN WAITING TO GET THIRSTY AND GUZZLING THE FLUID. THIS IS ESPECIALLY IMPORTANT WHEN CONSUMING FLUIDS DURING REHEARSALS THAT CONTAINS SALT AND SUGARS.

• ADA Position Paper. JADA. 100(12):1543-1556, '00

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Fluid Replacement Tips

- Encourage performing artists to hydrate before activity
- Have a scale available for monitoring weight pre- and post- activity
- Work with instructors/managers to establish fluid breaks during rehearsals and performances
- Provide optimal rehydration drinks
- Provide individual containers
- Provide drinks flavored to the performing artist's preference

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Issue 3: Excess Focus on Body *Weight* Rather Than Body Composition



- Obesity means having **too much body fat**.
- Overweight means **weighing more than the standard weight:height ratio or BMI**

Weight may come from...

- **Lean Mass** (more=good)
- **Bone Mass** (more=good)
- **Fat Mass** (more=**bad**)
- **Body Water** (more=generally good)



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Body Mass Index



- Intended for population assessments of obesity prevalence
- **Not** intended for individual diagnosis of obesity



- C Javed A, Lopez-Jimenez F et al. Pediatric Obesity 2015; 10(3): 234-244.

- BMI has high specificity but low sensitivity to detect excess adiposity and **fails to identify over a quarter of children with excess body fat percentage**.

fat and low lean. Definitely IS obese.

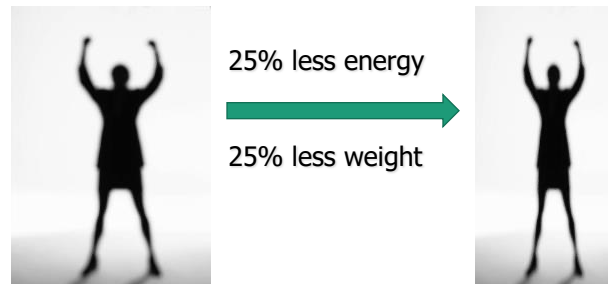
Source: Mridha S, and Barman P. Comparison of height-weight matched young-adult female athletes and non-athletes in selected anthropometric measurements. International Journal of Science and Research. 2014;3(1):265-268.

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Energy and Weight Loss: Theory

Please Consider: There is a difference between 'thinness' and 'leanness'

Logic: A 25% reduction in energy intake will lead to a 25% reduction in weight.

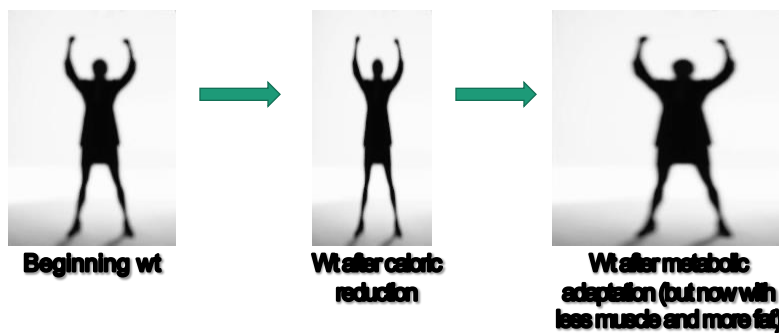


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Energy Restriction and Weight Loss: Actual

Reality: The amount of calories burned after weight loss is lower than would be expected by the amount of weight that was lost.

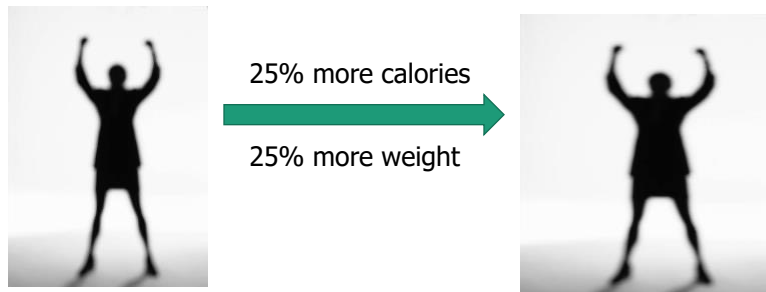
(Source: Saltzman and Roberts, *Nutr Rev*, 1995)



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Energy and Weight Gain: Theory

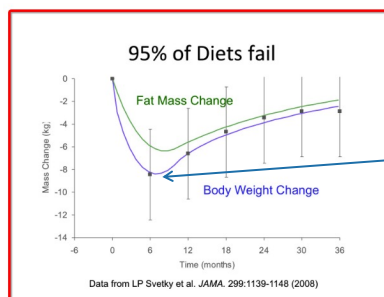
Logic: A 25% increase in energy intake will lead to a 25% increase in weight.



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MISPERCEPTION – Low Calorie Diets are an Effective Weight Loss Strategy

Reality: Low calorie diets are doomed to fail. Adaptive thermogenesis leads to same weight on lower energy intake, but the resultant weight has higher fat mass that makes you look bigger and increases cardiometabolic risks.



Note how long it takes for **Adaptive Thermogenesis** to kick in.

Most studies assessing 'diets' only assess weight change in subjects for 1 to 2 months, failing to determine what is really happening.

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Many Strategies for Assessing Body Composition

- **Multiple Skinfolds (Common)**
- **Bioelectrical Impedance (Common)**
- **DEXA (Common, Best)**
- **Densitometry (Hydrostatic Weighing) (Traditional)**
- Total Body Water
- Total Body Potassium
- Infrared Interactance
- Creatinine Excretion
- 3-Methylhistidine Excretion
- Total Body Electrical Conductivity
- Ultrasound
- Computed Tomography
- Magnetic Resonance Imaging

A recent study has found that multi-current BIA is a reliable and relatively low-cost strategy for determining body composition change over time, and can now assess multiple important aspects of body composition, including:

- Body Fat
- Lean Mass
- Abdominal Fat
- Skeletal Muscle Mass
- Inter and extracellular body water

Source: Velasquez et al. Within- and between-day reliability of laboratory-based body composition assessment methods. *British Journal of Nutrition*. 2026. Pg 1-9: doi:10.1017/S0007114526107752.

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Body Composition Tracking is Invaluable for Developing Appropriate Nutrition Intervention

Single measure vs. Multiple Measures: Delta Score (Change over time)



Analyzing trends is critical to understanding the performing artist. Single measures can be misleading and result in poor counseling.

What you say and how you say it impacts food restriction:

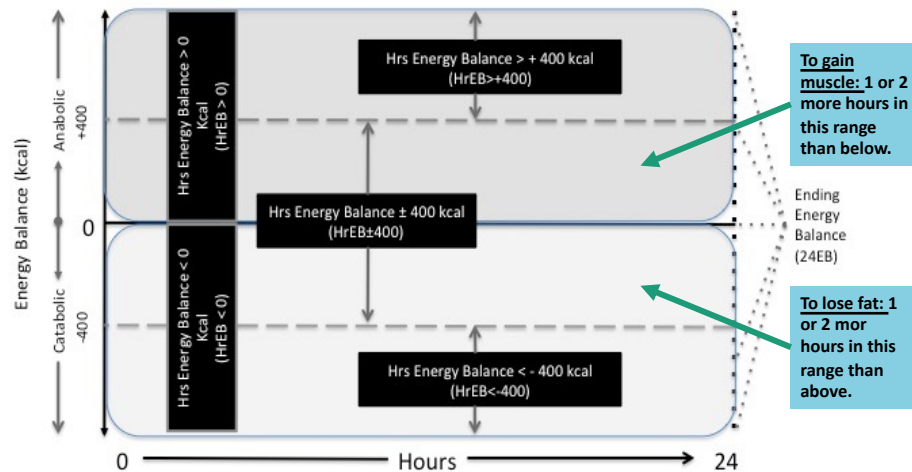
Example 1: Performing Artist who is told her body fat percent is too high.

Example 2: Same Performing Artist who is told her lean mass percent is too low.

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A New Model For Energy Balance Assessment, Fat Loss, and Muscle Gain

Benardot D. Energy thermodynamics revisited: Energy intake strategies for optimizing athlete body composition and performance. *Revista de Ciencias del Ejercicio y la Salud (Journal of Exercise Science & Health)*. 2013; 11(2): 1-13 (EISSN 1659-4436).



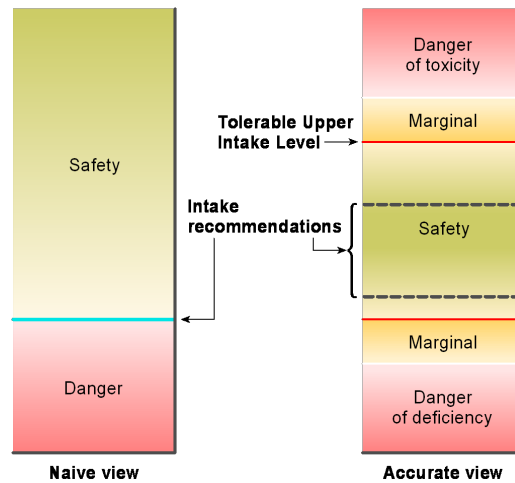
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Issue 4: Over-Reliance on Vitamin and Mineral Supplementation

- Humans have the capacity to store all vitamins and have a backup supply of all vitamins.
 - Example: The average human stores approximately 1,500 mg of vitamin C and has an average daily usage of approximately 15 mg/day. Assuming an individual is not stressed or sick, which increases the tissue usage for vitamin C, they would have approximately 100 days of vitamin C.
- Fat soluble vitamins have a higher storage capacity than water soluble vitamins, allowing for high seasonal consumption and storage of certain vitamins.
 - Example: Beta-carotene, the precursor to active vitamin A, which is abundantly obtained from orange/yellow-colored vegetables that are harvested in the fall.

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Recommended Dietary Allowance (RDA)



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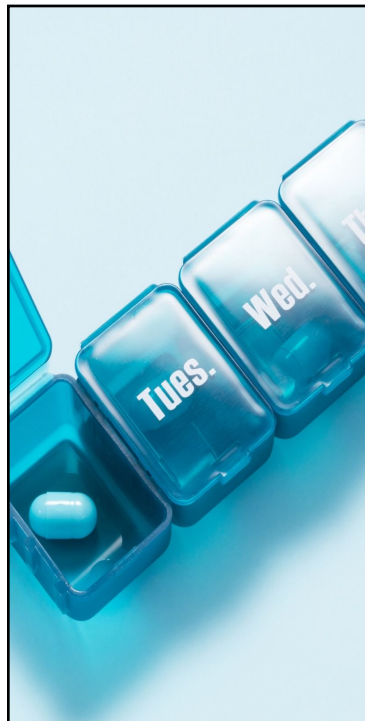
More than enough
not better than
enough

Supplement
'Issues'

- Taken in large amounts, some supplements may result in opposite of desired effect.
 - Vitamin E supplement *promotes* lipid peroxidation and inflammation during exercise. Med Sci Sports Exerc 2004; 36(8):1328-1335
 - > 500 mg leucine/kg/d may increase of adverse events. Tolerability of leucine in humans. Branched Chain Amino Acids in Clinical Nutrition: Nutrition and Health 2015. pp 3-13.

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JUMP HEIGHT STUDY COMPARING CARBOHYDRATE AND CREATINE SUPPLEMENTS
 [Koenig CA, Benardot D, Cody M, and Thompson W. Comparison of Creatine Monohydrate and Carbohydrate supplementation on Repeated Jump Height Performance. The Journal of Strength and Conditioning Research. 2008; 22(4):1081-1086.]

- No difference in first 6 of 10 jumps
- Jump 7, 250 kcal supplement significantly better than all other supplements
- Jump 8 & 9, 250 kcal and creatine supplements better than other supplements
- Jump 10, all supplements better than placebo
- In no case did creatine monohydrate outperform 250 kcal from carbohydrate
- Creatine monohydrate group gained 1.5 kg after 6 days; 250 kcal group gained 0.0kg after 6 days.

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More Than Enough Not Better Than Enough...

- After an average of 4 years of supplementation, the combination of beta-carotene and vitamin A had no benefit and may have had an adverse effect on the incidence of lung cancer and on the risk of death from lung cancer. N Engl J Med 1996; 334:1150-5
- There is no convincing evidence that 'immune-boosting' supplements, including high doses of antioxidant vitamins and zinc, prevent exercise-induced immune impairment and evidence is currently lacking. J Sports Sci 2004; 22:115-125.
- Data indicate that vitamin E (800 IU for 1-2 months) compared with placebo ingestion before a competitive triathlon race event *promotes* lipid peroxidation and inflammation during exercise. Med Sci Sports Exerc 2004; 36(8):1328-1335
- Cancer patients taking vitamins A and E to boost the immune system may, in fact, keep cancer cells from dying via the natural protective process called apoptosis. Melville www.scienceagogo.com) from UNC-CH.
- Vitamin E had NO significant effect on reducing lower respiratory tract infections in elderly nursing home residents. JAMA 2004; 292(7): 828-36

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Dietary Supplements and Mortality Rate in Older Women (Mean Age = 62 yrs.)

Nutrient Supplement	Absolute Risk Change
Multivitamins	2.4% Increased Risk
Vitamin B6	4.1% Increased Risk
Folic Acid	5.9% Increased Risk
Iron	3.9% Increased Risk
Magnesium	3.6% Increased Risk
Zinc	3.0% Increased Risk
Copper	18.0% Increased Risk
Calcium	3.8% Decreased Risk

Source: Mursu J, Robien K, Harnack LJ, Park K, and Jacobs DR. Dietary supplements and mortality rate in older women: The Iowa Women's Health Study. *Archives of Internal Medicine* 2011; 171(18): 1625-1633.

Summary: In older women (N=38,772), several commonly used dietary vitamin and mineral supplements were found to be associated with increased total mortality risk. Calcium is associated with decreased risk. It was noted that in 1986, 66% of women studied took supplements; and in 2004 that increased to 85% of women.

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Absorption Issues: Minerals

- Competitive Absorption of Divalent Minerals, which are all absorbed in the proximal duodenum:
 - Iron
 - Zinc
 - Calcium
 - Magnesium

Example: A large dose supplement of Iron, often about 60mg, with the RDA ranging from 8mg (males) to 18mg (females), takes up a large portion of the absorption site, inhibiting the absorption of the other divalent minerals.

In addition, an elevated level of unabsorbed iron (an inflammatory metal) has been shown to elevate colon cancer risk.

Yousefi MH et al., An overview of the current evidences on the role of iron in colorectal cancer: a review. *Frontiers-Oncology*. 2025; Vol 15: <https://doi.org/10.3389/fonc.2025.1499094>.

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Issue 5: Excess Focus on Protein with Failure to Understand How Best to Consume it

- The maximal rate of protein utilization in humans is ~1.7gm/kg mass.
- The RDA for protein is 0.8gm/kg
- The maximal amount of protein a human can metabolize anabolically (i.e., to make hormones, enzymes, tissue repair, etc.) is approximately 30gm/meal.
- Because humans are 'energy-first' systems, metabolizing protein anabolically requires a reasonably good state of energy balance. Low energy balance results in the consumed protein to be used to satisfy the energy requirement.

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Excess Protein Issues...

- Assoc. with high intakes of kcals & saturated fat
- Associated with obesity & metabolic syndrome
- Often converted to glucose & fat for energy & storage while protein is used for energy
- **Increases uric acid** (can lead to **gout** or **bone** issues)
- In infancy, can lead to obesity & metabolic syndrome
- Increases need for hydration & risk of dehydration
- Inconsistent recommendations: NAS and DRI

Excess Protein Intake:

- Elevated blood lipids
- Higher risk of heart disease
- Stress on the kidneys
- Higher dehydration risk
- Intestinal discomfort
- Nausea
- Fatigue
- Headaches

If excess protein is chronically consumed and the performing artist is dehydrated, the required nitrogenous excretion via concentrated urine can be damaging to the kidneys.

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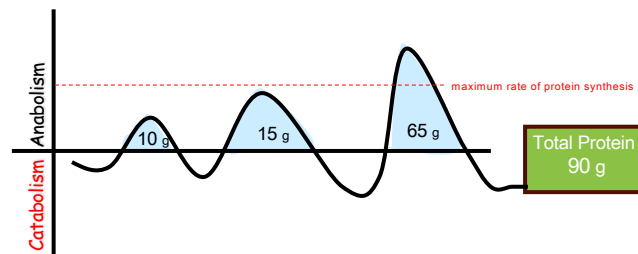
How Much?

- Protein NOT Stored for future use; use it or lose it
- **Dietary protein -----> Body proteins**
- **Excess dietary protein -----> energy; fat; glucose**
- Too much protein: no (obvious) benefit
- Too little protein: lose muscle, decay in autoimmune function, failure to thrive (children), increased disease frequency
- Don't overlook the protein contribution to total energy requirement.

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How Daily Protein is Distributed Matters - Typical ? -

Source: Paddon-Jones D, Rasmussen BB. Dietary protein recommendations and the prevention of sarcopenia. [Curr Opin Clin Nutr Metab Care](#). 12(1):86-90; 2009



A skewed daily protein distribution fails to maximize potential for muscle growth

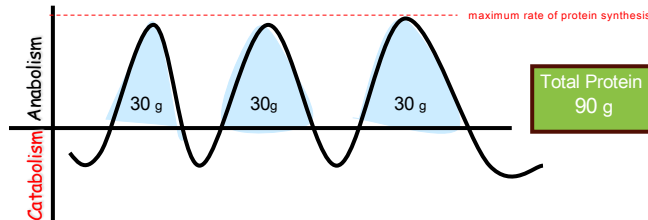
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Daily Protein Distribution - Optimal -

Source: Paddon-Jones et al., 2009

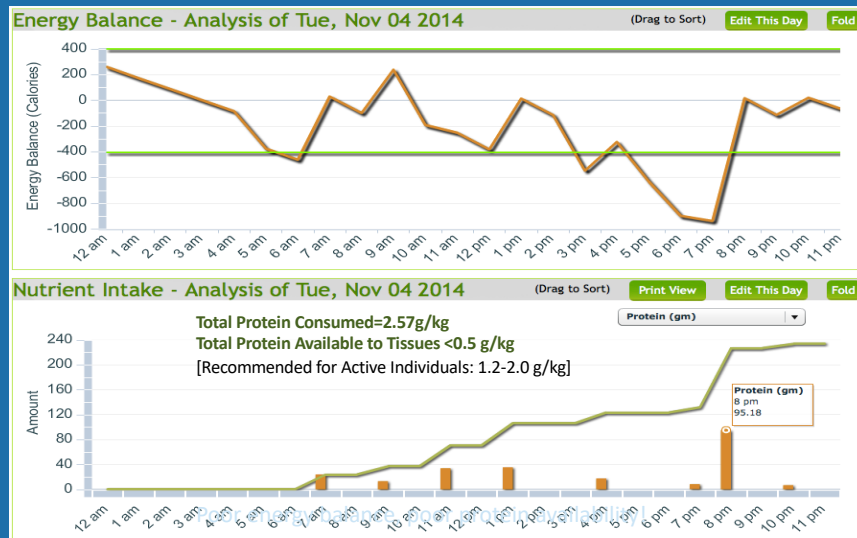
Evenly distributing protein intake increases the inevitability that energy substrates, vitamins, and minerals will also be more evenly distributed.



Repeated maximal stimulation of protein synthesis
→ increase / maintenance of muscle mass

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Example Protein Matched with Hourly Energy Balance



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Complete Protein Worksheet

	EAA1	EAA2	EAA3	EAA4	EAA5	EAA6	EAA7	EAA8	(EAA9)
Ideal	20	10	10	20	30	30	40	20	10
Eaten	10	10	10	20	30	30	40	20	10
Use	10	5	5	10	15	15	20	10	5
Lost	10	5	5	10	15	15	20	10	5

1 Essential Amino Acid (in this example EAA1) that is below the ideal level relative to the other Essential amino acids, results in a proportionate loss of the other Essential Amino Acids

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Complementary Proteins

Food	Amino Acids That Are Low (Not Missing)	Foods That Can Improve Quality (Complementary Foods)
Legumes (lentils, peas, beans, peanuts)	■ Tryptophan ■ Methionine	■ Grains ■ Nuts ■ Seeds
Grains (wheat, corn, oats, rice, rye, barley)	■ Lysine ■ Isoleucine ■ Threonine	■ Legumes ■ Dairy
Nuts and seeds (almonds, sunflower seeds, cashews, etc.)	■ Lysine ■ Isoleucine	■ Legumes

The body works in real time: Example: Beans and Rice must be consumed at the same time so there is an ideal balance of the essential amino acids presented to cells at the same time.

Source: Benardot D. 'Nutrition for Exercise Science'. Wolters Kluwer © 2019

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Protein Content of a 2,000-Calorie Meal Plan		
Food	Kcal	Protein (g)
Orange juice (1 cup)	112	1.74
Cracked wheat brd, (2 slices)	132	4.37
Strawberry jam (1 tablespoon)	55	0.12
Hard-boiled egg (1 egg)	88	6.29
Roast beef sandwich	346	21.5
1 cup low-fat (1%) milk	102	8.03
1 raw apple	87	0.26
Small tossed salad (3/4 cup)	27	1.3
Salad dressing (1 tbsp)	67	0.09
Chocolate chip cookies (5 sm)	125	1.43
Gatorade (16 ounces)	100	0.00
Chicken breast (1/2 broiled)	152	26.67
Broccoli (1/2 stalk)	22	2.32
Baked potato	145	3.06
French bread (2 slices)	203	6.37
Vanilla ice cream (1/2 cup)	135	2.4
Totals	2000	93.98

Note: A 120-pound active person would require approximately 1.5 grams of protein per kilogram of body weight. To convert pounds to kilograms, divide pounds by 2.2 ($120/2.2 = 55$ kg). Then multiply kilograms by 1.5 ($55 \times 1.5 = 82.5$). The protein requirement for this 120-pound individual is 82.5 grams. The protein provided by 2,000 calories is more than 10 grams greater than the requirement.

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Issue 6: Nonexistent Recovery Strategy Following Performance/Rehearsal

GOALS

- Recover from Underhydration/Dehydration
- Recover Glycogen Stores
- Enhance Muscle Protein Synthesis
- Reduce Exercise Associated Muscle Soreness

Note: Glycogen Synthase is at its highest point when liver and muscle glycogen are at their lowest point... immediately following rehearsal/performance.

However, Glycogen Synthase begins to drop rapidly. Therefore, to optimize glycogen stores recovery, a good carbohydrate source should be consumed as soon as possible following a performance/rehearsal.

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Recovery Nutrition Strategies

- **Within 30-60 minutes following performance/rehearsal**
 - Replace every pound of weight lost through sweating with 20-24 ounces of fluid
 - A fluid containing a 4:1 ratio of carbohydrate to protein is better than water during this period
- **60-90 minutes after competition**
 - Continue to hydrate
 - Consume recovery food (snack, shake or bar) containing ~ 4:1 ratio of carbohydrate to protein
- **Within 3 hours after competition**
 - Mixed Meal – combination of protein, carbs and fat
 - Continue to hydrate
 - **NO** soda, alcohol, or 'energy drinks' (excessively high in caffeine and sugar)

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Nutrition Recovery Strategy, Continued...

- **Going Home**
 - Hydrate constantly
 - Consume plenty of water with consumed foods.
 - Drink well-formulated sports beverages (~6-7% carbohydrate solution + ~100mg sodium/cup) if drinking without foods
 - Frequent bathroom breaks to urinate (about once/hour) is a sign that sufficient fluids are being consumed.
- **Once Home**
 - Return to a normal eating pattern as quickly as possible.
 - Focus on high carbohydrate (vegetables, fruits, whole grains), low fat, moderate protein foods.
 - Drink plenty of water with meals.
 - Try to return to a normal sleep cycle as quickly as possible.
- **Within 24 hours after competition**
 - Strictly limit the consumption of...
 - Alcohol
 - Soda
 - High caffeine/sugar beverages (advertised as 'energy drinks')

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Issue 7: Work Environments That May Contribute to Nutritional Issues

- Encourage the development of environments that enable frequent hydration.
- For long rehearsals and/or performances, incorporate breaks with easily available snacks (fruits, vegetables, lean meat, etc.) and beverages.
- Obtain a clarification of reasons why periodic snacking/drinking is not allowed so that strategies can be developed to overcome the stated reasons.
- Try to follow the same strategies during performances that are possible during rehearsals. Practicing a strategy enables better adaptation.

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Issue 8: Excess Focus on 'Good Foods', Inhibiting Dietary Variety.

- **Reality:** People who continuously eat the same few foods because they believe these foods are 'healthy' are at risk of malnutrition. **There is no perfect food.**



Sources:

- Guyonnet S, and Rolland Y. Screening for malnutrition in older people. [Clinics in Geriatric Medicine](#) 2015; 31(3): 429-437
- Murray E, and Manary M. Possible role of the microbiome in the development of acute malnutrition and implications for food-based strategies to prevent and treat acute malnutrition. [Food and Nutrition Bulletin](#) 2015; 36(1): S72-S75

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Color Wheel of Foods & Phytochemicals Source: Dr. David Heber, UCLA Center for Human Nutrition		
Color Group	Phytochemicals	Fruits and Vegetables
Red	Lycopene Phytoene Phytofluene Vitamin E	Tomatoes Tomato Sauce Vegetable Juice Tomato Soup Watermelon
Green	Glucosinolates Isothiocyanates Indole-3 Carbinol Folic Acid	Broccoli Brussel Sprouts Bok Choy Cauliflower Cabbage
Green/Yellow	Lutein Zeaxanthin	Spinach Avocado Kale Green Beans Green Peppers Kiwi Collard Greens Mustard Greens

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Orange	Alpha & Beta Carotene Beta-Cryptoxanthin	Carrots Pumpkins Butternut Squash Mangos Apricots Cantaloupe
Orange/Yellow	Vitamin C Flavonoids	Oranges, Orange Juice Tangerines Yellow Grapefruit Peaches, Nectarines Lemons, Limes Papaya, Pineapple
Red-Purple	Anthocyanins Ellagic Acid Flavonoids	Grapes and Grape Juice Cherries, Red Wine Strawberries, Blueberries Blackberries, Raspberries Cranberries, Plums Prunes, Raisins
White/Green	Allyl Sulfides	Garlic, Onion Chives

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In this example, there is
NO single food that can
supply all of the
nutrients/phytonutrients
associated with good
health.

Only *variety* of intake works:

1. Better assurance of exposing tissues to all nutrients
2. Better assurance of avoiding excess tissue exposure to any nutrient/food substance.

By their very nature, restrictive 'weight loss' intakes limit nutrient exposure.

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Conclusion

Important Factors To Consider

PLAN a 'FOOD FIRST' approach to meeting needs rather than a pharmacological approach to nutrition.

- *Performing artists should develop a frequent eating strategy with food that helps them obtain the needed energy and associated nutrients.*
- *Optimize energy and hydration status before initiating exercise.*
- *Performing artists must have a good strategy for fluid consumption during exercise to keep blood volume and blood constituents (i.e., glucose) normal.*
- *Don't let the performing artist leave the rehearsal/performance venue without providing them with an opportunity for appropriate recovery foods/beverages.*

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**Nutrition Issues in
Performing Artists:
Problems and
Solutions**

Thank You!

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