TODAY'S "HOT TOPICS"

NUTRIENT TIMING AND WORKOUT NUTRITION

4

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01

IS NUTRIENT TIMING DEAD?

AND DOES WHEN YOU EAT REALLY MATTER?

02

WORKOUT NUTRITION ILLUSTRATED [INFOGRAPHIC]

WHAT TO EAT BEFORE, DURING, AND AFTER EXERCISE.

03

WORKOUT NUTRITION EXPLAINED

WHAT TO EAT BEFORE, DURING, AND AFTER EXERCISE.

IS NUTRIENT TIMING DEAD?

And does when you eat really matter?

By Brian St. Pierre

"Nutrient timing" sounds impressive. Science-y. The way sport and exercise people throw it around, you'd think it must be pretty important.

But is it really? Does when you eat really matter? For health? For body composition? For performance?

Let's take a closer look and find out.

Nutrient timing — simplified

Nutrient timing simply means eating specific *nutrients* (such as protein or carbs)... in specific *amounts*... at specific *times* (such as before, during, or after exercise).

Researchers have explored this practice from different angles over the last few decades. And their findings have generated a lot of excitement.

In the early 2000s, with the publication of ***Nutrient Timing: The Future of Sports Nutrition*** by Drs. John Ivy and Robert Portman, the idea of nutrient timing became the "Next Big Thing."

Seriously, every sports nutritionist worth their branched chain amino acids owned a copy. Including yours truly. I even wrote a few college papers on the topic.

And our very own Dr. John Berardi — JB, as he's known around here — was one of the early researchers in this area.

Much of his Masters and PhD research was done looking at nutrient timing and how it affected recovery from very intense exercise. He even contributed to the aforementioned nutrient timing book.

Postworkout and anytime meals

No surprise, the concept of nutrient timing worked its way into Precision Nutrition's general recommendations. We divided meals into post-workout (PW) or anytime (AT), these categories implying that different meals should be eaten at different times of the day.

For example:

- **PW meals are higher in carbs,** especially faster-digesting starchy carbs (such as potatoes or rice) or sweeter carbs (such as fruit).

- **AT meals are lower in carbs,** focusing more on lean protein plus healthy fats and high-fiber vegetables.

The scientific evidence — limited at the time — seemed to show that this strategic placement of carbs could help hard-exercising people perform better while getting leaner, stronger, and healthier.

But the evidence wasn't limited to athletes. Even type 2 diabetics respond better to carbohydrates after a carbohydrate-depleting workout. Thus, our PW/AT recommendations were born.

But things have changed

Just like JB's choice of facial hair, and my transition from athlete to dad, things have changed in the last 10-15 years.

Well, not so much changed. Rather, our knowledge has deepened, as it always does when more research becomes available.

Since the early 2000s, for example, we've discovered that **some of those early studies had design flaws or weaknesses.**

- **First, they were mostly short-term** — spanning a few weeks or months, maybe even just a few workout sessions. Because of this, they didn't really tell us what would happen over a longer time span.

- **Second, they considered what we call "soft" end-points**, such as protein synthesis, glycogen replenishment, or nitrogen balance. Because of this, we didn't have data on "hard" endpoints such as actual fat loss or lean mass gain.

Interestingly, as more long-term data appeared, nutrient timing started to seem like less of a universal solution.

Sure, there were still strong indications that it could be useful and important in certain scenarios. For example, many of our clients reported fantastic results. Plus, there's the famous and often-cited 2006 study by Cribb and Hayes.

In that study, the researchers showed that protein, carbohydrates, and creatine taken around a training session could lead to more muscle mass and strength gain than those same nutrients eaten further from the session.

Unfortunately very few people talk about the flip side: **Further research, using similar protocols, failed to find the same effect.**

Nutrient timing may not be all that important

So, what do we make of this?

Well, research studies aren't perfect. And findings don't always agree. So rather than duking it out on a study-by-study basis, I'll bottom-line it for you.

Based on the current body of research, and PN's experience with more than 50,000 clients, I've come to realize that **nutrient timing isn't particularly important for most people trying to look and feel better.**

Let me be clear: no, I don't think nutrient timing is dead, worthless, whatever. In certain situations it's probably really important. (We'll explore them below.)

However, lots of really smart and hard working people are getting lost in the finer points of nutrient timing, while consistently missing out on sleep, or vegetables, or other — more important — health and lifestyle factors. And that's a shame.

So, that's my bottom line. But, if you're up for it, let's go a little deeper.

Post-workout "anabolic window of opportunity"

For years, the Holy Grail of nutrient timing research has been something we call the post-workout "anabolic window of opportunity."

The basic idea is that **after exercise, especially within the first 30-45 minutes or so, our bodies are greedy for nutrients.**

In theory, movement — especially intense movement, such as weight training or sprint intervals — turns our bodies into nutrient-processing powerhouses.

During this time our muscles suck in glucose hungrily, either oxidizing it as fuel or more readily storing it as glycogen (instead of fat). And post-workout protein consumption cranks up protein synthesis.

In fact, one study even showed that waiting longer than 45 minutes after exercise for a meal would significantly diminish the benefits of training.

Hurry, the anabolic window is closing!

With these physiological details in people's minds, it became gospel that we should consume a fast-digesting protein and carbohydrate drink the minute our training ended.

Or, even better, immediately before training. (Maybe even during training, too, just for good measure.)

It seemed that the faster we could get these nutrients into our systems, the better. Seriously, I couldn't have been the only one who started to panic the second the last dumbbell hit the floor, ripping open my sports drink container with fumbling fingers, desperate to catch that magic protein synthesis train.

Go! Go! Go! Anabolic window is closing!

The only problem: Research supporting this idea was short-term.

And just because we see positive effects in the short-term (like, in the next half-hour) doesn't mean these effects will contribute to long-term results (like, in 3 months).

In fact, recent longer-term studies, as well as two incredibly thorough reviews, indicate that **the "anabolic window of opportunity" is actually a whole lot bigger than we used to believe.**

It's not a tiny porthole that you practically have to squint to see through. It's a huge, cathedral-like opening.

Chill out man, there's still time

While it's still wise to bookend your training with protein and carbohydrates, you probably have one or two hours on both sides of your training to get those benefits. What's more, for most people — save a few specific types of athletes — it doesn't seem to matter how fast you digest things.

So imagine this:

Rather than worrying about slamming down some waxy maize starch and whey hydrolysate immediately after training, shoving people out of the way on your mad dash to your gym bag for your Super Shake bottle, you can actually drive home, take a shower, prepare, and eat a delicious whole food mixed meal.

To back up this idea, recent data suggests that **the total amount of protein and carbohydrate you eat, over the course of the day, is more important for body composition and performance than nutrient timing strategies.**

So, make no mistake, we're not done with workout nutrition. Rather, we're simply more open to the idea that there are several ways to eat for performance and body composition.

In other words, there's no one, immutable, do-it-this-way-or-you're-screwed approach. When is there ever?

How about meal scheduling?

Eager gym-goers and researchers have also wondered about another nutrient-timing concept: if there's a "best time" to eat.

For years, most nutrition experts told people to eat more of their calories and carbs at breakfast, and to keep calories — and especially carbs — lower at night.

Then, all of a sudden, some newfangled experts began recommending the opposite, telling us to eat the majority of our calories and carbohydrates at a dinner-time feast. (Nowadays this idea is associated with something called carb back-loading.)

So who's right?

The breakfast club

The research in this area remains limited, but it is interesting.

A recent study asked: Does it matter whether you eat half your day's calories at dinner or at breakfast? And, by "matter," the researchers mean: would it affect body weight, waist circumference, appetite, and several blood markers of glucose tolerance and insulin sensitivity?

Well, the group who ate half of their daily calories at breakfast lost

more weight and more inches from their waists, showed greater improvements in glucose control and insulin sensitivity, and reported being more satisfied (along with having lower levels of grehlin, our main hunger hormone).

Wow. Clearly eating more calories at breakfast is the way to go, right?

No, no...it's all about dinner

Not so fast. The "carbs and calories at dinner" folks can also call on research to support their views.

Take, for example, the *Journal of Nutrition* study that compared eating 70 percent of your calories at night versus eating them at breakfast.

In highly controlled settings, where all subjects completed resistance and aerobic exercise, the calories-at-dinner group retained more muscle and lost an equal amount of body fat to the calories-at-breakfast group!

Not only that, but more recently, a six month study found that weight loss, waist circumference, and body fat loss were all greater when the majority of the day's carbohydrate intake was at night, rather than spread evenly throughout the day.

The "more carbs at night" protocol was also better at improving glucose control, markers of inflammation, blood lipids, and appetite.

OK, forget the schedule

So who's right? The breakfast advocates or the dinner advocates? Well, it depends.

Some research has found breakfast to be the best time for big meals (3 studies), some has found no differences in weight loss between big breakfasts and big dinners (2 studies), and other research has found significant benefits from eating more at night (2 studies).

What can we discern from this contradictory mish-mash of findings?

Really, it's simple:

We're all unique. There's no one-size-fits all rule.

Indeed, research into circadian rhythms has found that humans (and animals) vary a lot in their natural sleep-wake cycles. So why wouldn't the same diversity be true of our natural feed-fast cycles?

The take-home message:

Follow *your* **evidence. Track** *your* **experience. Do what works — measurably — for** *you*. Flow with your natural inclination, and where your own self-experimentation takes you.

If early sunshine and scrambled eggs gets you through the day feeling awesome, great. If a robust dinner is more your thing, enjoy drifting off to sleep with the warm fuzzy feeling of a full belly.

Just like when you exercise, **what's most important is that you make high-quality choices, consistently, whenever it works for** *you*.

But what about... no breakfast?

The "calories at breakfast" vs. "calories at dinner" debate also raises the question: What about skipping breakfast?

Wait a minute. *No breakfast?*

Surely everybody knows that breakfast is the most important meal of the day! And, in particular, that it's a good idea to eat most of our carbs in the morning.

Well, at least that's what my grandparents always told me.

Behind this recommendation lies the notion that by breakfast time, we've fasted for eight to twelve hours. Our bodies are therefore primed to use nutrients (and especially carbs) more effectively than at other times of the day.

Our glycogen levels, especially those in our livers, are running low. Plus, some evidence does suggest that we use carbohydrates more effectively in the morning than at night.

So it seems only logical to make sure we take in more carbs at breakfast than at dinner. Right?

By now I hope you see how this argument falls apart.

It's not that having breakfast is wrong; or that having carbohydrates at breakfast is wrong. In fact, both choices are just fine.

What's wrong is the assumption that **what works for you is necessarily what's best for** *everyone*.

Shattering the breakfast myth

While almost everyone in nutrition, for the last 20 years, has repeated the "breakfast is the most important meal of the day" story, it turns out that **this argument in favor of breakfast is actually quite weak.**

The only support comes from correlational research (X and Y happen at the same time), and not causal research (Y happens because of X). And that makes the "evidence" flawed.

In a recent *American Journal of Clinical Nutrition* paper, researchers analyzed dozens of studies to look at the relationship between breakfast and body weight. Their conclusion: The commonly cited link between eating breakfast and lower body weight is "only presumed true."

Presumed true. As in "People *think* it's true." Not *for-sure* true. As in, "We *know* it's true."

That doesn't sound terribly definitive, does it?

Of course, just because one study came to a certain conclusion doesn't mean the case is closed.

So let's take a closer look at some of the proposed benefits of eating breakfast.

The benefits of breakfast

In the literature, eating breakfast is consistently associated with:

- decreased overall appetite;
- decreased overall food consumption;
- decreased body weight;
- improved academic performance; and/or
- improved blood sugar control.

If we stopped there, of course we'd assume that skipping breakfast is a dumb move. However, we can't stop there. Because, again, most of this evidence is observational. It suggests there's a relationship — a correlation — without *proving* a cause.

So here's the bottom line: When examining research that actually controls for all the variables and looks at cause and effect, the results are pretty mixed.

In other words, **breakfast looks to be beneficial for some of us. But not for others.** The strongest of this evidence suggests that breakfast is most important for malnourished or impoverished children. But, for other populations, it seems to be just another meal. No better. No worse. Completely negotiable.

The benefits of no breakfast

If breakfast isn't all it's cracked up to be, what about skipping breakfast? Because — you guessed it — some research actually suggests that skipping breakfast might make you stronger, leaner, and healthier. (By now, my grandparents must be groaning.)

For example:

- Folks with Type 2 diabetes did better when they skipped breakfast altogether and ate a larger lunch.
- Other folks who were told to skip breakfast ended up eating less overall compared to breakfast eaters.
- And skipping breakfast was found to be just as effective as eating breakfast for weight loss.

So, **will skipping breakfast be better for *you?***

Maybe yes. Maybe no.

Preliminary evidence suggests that skipping breakfast can:

- increase fat breakdown;
- increase the release of growth hormone (which has anti-aging and fat loss benefits);
- improve blood glucose control;

- improve cardiovascular function; and/or
- decrease food intake.

However, the truth is, most of this research has been done in animals, with only a few conclusive human studies.

So, while intriguing, there's certainly no guarantee that these changes in our physiology will actually lead to long-term benefits.

In fact, if there's one thing we can say for sure, it's that immediate changes like these can often be deceiving. Often the body "corrects" for them later — seeking homeostasis.

In other words, acute changes don't always lead to chronic ones.

That's why **short-term effects from nutrient timing protocols don't always translate into the long-term changes we're hoping for.**

Is changing your breakfast routine most important?

Finally, a recent study offers a fascinating postscript to the breakfast and weight loss question.

Researchers broke people up into one of four groups:

1. Habitual breakfast skippers assigned to eat breakfast
2. Habitual breakfast skippers assigned to skip breakfast
3. Habitual breakfast eaters assigned to eat breakfast
4. Habitual breakfast eaters assigned to skip breakfast

Guess what? The groups whose habits and routines were changed were the ones with the most substantial weight loss.

The people who normally ate breakfast and skipped it during the study lost weight. And the people who normally skipped breakfast and ate it during the study lost weight.

Ultimately, this study showed that **when people become more aware of their intake, they get better results — whether they eat breakfast or skip it.**

So in the end, eating or skipping breakfast is purely a matter of preference.

There is no right or wrong choice, as long as whichever choice you make is actually helping you improve your health, performance, and body composition.

What about meal frequency?

Let's explore one more "nutrient timing" idea.

For years dietitians and nutritionists (myself included) thought that the best approach to splitting up your daily food intake was to eat small meals frequently throughout the day. In college I ate eight times per day. Yes, eight!

From early research we assumed that eating often would speed up the metabolism, help control the hormones insulin and cortisol, and manage the appetite.

However, a recent review in the *Journal of the International Society of Sports Nutrition*, and other lines of evidence, suggest otherwise:

As long as we eat the right foods in the right amounts, meal frequency seems to be a matter of personal preference.

You can eat lots of small meals each day (i.e. every few hours). Or you can eat a few big meals each day (i.e. with bigger time gaps between them). And there's almost no physiological difference.

There could be *psychological* differences, mind you. Which is why I highly recommend listening to your own body. And why not apply JB's famous *"How's that workin' for ya?"* test.

If you're covering all your other bases and your current meal frequency isn't working, try switching it up. Experiment with fewer meals if you eat more frequently. And more meals if you eat less frequently.

Because either approach is physiologically valid, you're free to find the lifestyle approach that works best for you.

(And, of course, expert coaching can really help fast track this process. If we can help — it's what we do — give us a shout.)

When nutrient timing still matters

Make no mistake, nutrient timing is a complex subject. It'd take an entire book to cover it exhaustively.

So, for now I pose this question: Is nutrient timing dead?

The answer: Of course not!

There are legitimate uses of nutrient timing for certain people. (More on this below.)

Just remember this:

Nutrient timing can be helpful. Or it can add layers of unnecessary complexity. It all depends on the context.

If you're a bodybuilder or endurance athlete, the meaning of nutrient timing is much different than if you're an overweight office worker just getting into exercise and trying to improve your nutrition.

Indeed, if you're just starting out — and looking to get healthier and more fit — you don't need specific nutrient timing protocols.

At that point in the game, there are more important things to do. Here's a helpful prioritization checklist.

Your nutritional hierarchy of importance

1. ***How much* are you eating?**
   (Recommendation: Eat until satisfied, instead of stuffed, follow PN's Calorie Control Guide.)

2. ***How* you are eating?**
   (Recommendation: Eat slowly and mindfully, without distraction.)

3. ***Why* are you eating?**
   (Hungry, bored, stressed, following peer pressure, social cues, triggered by hyper-rewarding foods?)

4. ***What* are you eating?**
   (Recommendation: Minimally processed proteins, veggies, fruits, healthy starches, and healthy fats.)

5. **Are you doing #1 to #4 properly, *consistently?***
   (Recommendation: Shoot for 80 percent consistency with these items before moving on.)

And only then consider...

6. ***When* are you eating?**
   (Now you can consider breakfast, late-night, during your workout, etc.)

As you can see, nutrient timing makes the list, but it's at the bottom. Timing your nutrients *can* help, but only if you have the other — *and much more important* — aspects of your eating in order first.

Once they're in order...

Nutrient timing may be important for "elite eaters"

Some people are already very lean, compete at the elite levels of physique or athletics, and have nailed down items #1 to #5 above.

For folks like pro bodybuilders, physique competitors, and/or weight class athletes, an extra half-percent of body fat can mean the difference between winning and losing.

These athletes often engage in training or events lasting longer than two hours at a stretch, where added carbohydrates, electrolytes, and a little protein can go a really long way.

Nutrient timing may also be important for multiple exercise sessions

If you're not an "elite eater" or athlete, you can still benefit from nutrient timing if you're doing more than one activity session a day.

For example, perhaps you're competing in a tournament with multiple bouts, or spending a day having outdoor adventures — hiking in the morning, whitewater rafting in the afternoon, etc.

In this case, you'll want to time your intake a little more precisely, to take advantage of both the post-activity "refill" window as well as the non-active periods when you can "rest and digest" most comfortably.

The rest of the time, don't bother

For most of us, most of the time, nutrient timing demands extra effort, requires additional planning, and adds dietary complexity… with minimal return.

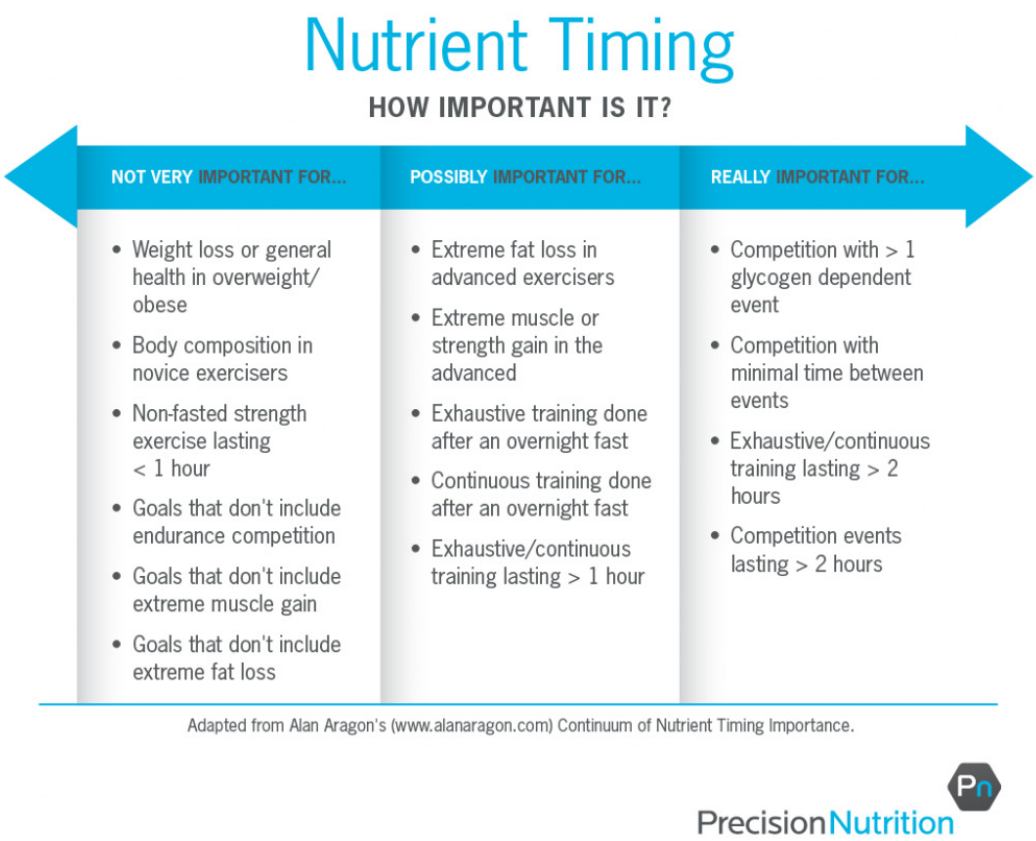
Also, **the best nutrient timing in the world won't compensate for a poor-quality, mindless, and/or inconsistent intake.**

That's why, at Precision Nutrition, we've transitioned away from emphasizing the PW and AT distinction for most clients, especially those enrolled in our PN Coaching programs.

(Please note, we didn't say *all* clients, just most. For some, the PW and AT set-up simply works. It provides a successful and repeatable framework for controlling their total intake. Being results-oriented coaches, that is cool with us.)

Our experience with thousands of clients, and new scientific evidence, show us: For most people, nutrient timing is *not* a main priority.

This chart, adapted from Alan Aragon, explains.



Here's what to do

The nutrition world can be pretty complex. But, at PN, we like to **keep it simple.**

We like clients to *think* **less about food decisions. And** *do* **more of the few essential behaviors that matter.** *Consistently*.

Again, here are your nutritional priorities, in order of importance.

Review:

1. ***How* much are you eating?**
   (Recommendation: Eat until satisfied, instead of stuffed, follow PN's Calorie Control Guide .)

2. ***How* you are eating?**
   (Recommendation: Eat slowly and mindfully, without distraction.)

3. ***Why* are you eating?**
   (Hungry, bored, stressed, following peer pressure, social cues, triggered by hyper-rewarding foods?)

4. ***What* are you eating?**
   (Recommendation: Minimally processed proteins, veggies, fruits, healthy starches, and healthy fats.)

5. **Are you doing #1 to #4 properly, *consistently?***
   (Recommendation: Shoot for 80 percent consistency with these items before moving on.)

And only then, if you *really* need it, consider...

6. ***When* are you eating?**
   (Now you can consider breakfast, late-night, during your workout, etc.)

Focus on mastering #1 to #4. For help on how to do this, check out our Calorie Control Guide for Men and Women.

And then, only if you need to, consider adding some basic nutrient timing.

Otherwise, enjoy eating what you're eating, whenever it suits you best.

WORKOUT NUTRITION ILLUSTRATED [INFOGRAPHIC]

What to eat before, during, and after exercise.

By John Berardi and Brian St. Pierre

We all know that *what* you eat is important. But so is *when* you eat, especially if you're active. That's why, in this workout nutrition infographic, we share what to eat *before*, *during*, and *after* exercise.

WORKOUT NUTRITION

WHAT TO EAT BEFORE, DURING, AND AFTER EXERCISE

Sometimes workout nutrition can be confusing. Let's make it simpler. Here's what to eat before, during, and after exercise broken down by body type and goal.

I'M AN ECTOMORPH

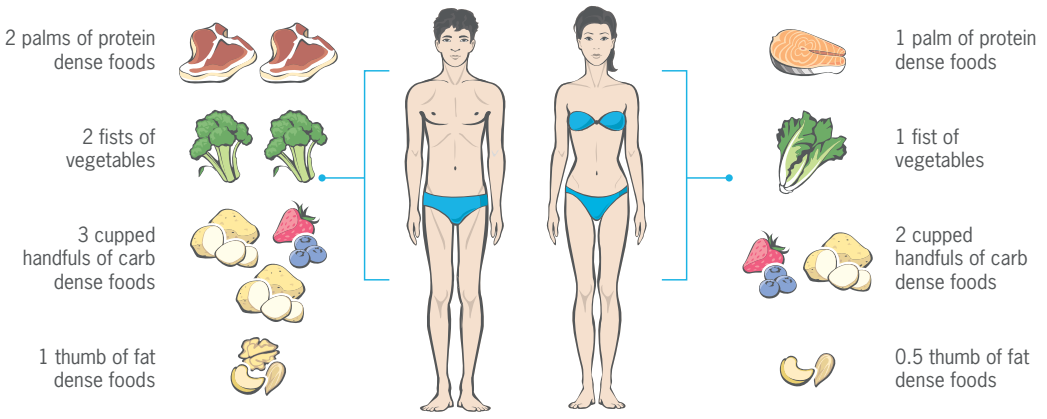
I'm generally lean, with a smaller frame and thinner limbs. I have a fast metabolism and tolerate carbs well. **I'm usually trying to gain muscle or support my endurance exercise.**

WHEN TO EAT

BEFORE EXERCISE	DURING EXERCISE	AFTER EXERCISE
Eat "ectomorph meal" 1-2 hours before activity	**For weight gain:** *1 P+C drink* **For endurance support:** *1 P+C drink* **For fat loss:** *BCAAs or water* **For body recomposition:** *BCAAs or water* **For maintenance:** *BCAAs or water*	Eat "ectomorph meal" 1-2 hours after activity

THE ECTOMORPH MEAL

USE YOUR HAND TO MEASURE



PORTION SIZES

Instead of counting calories, you can use your own hand as a portable portion guide. Your palm measures protein, your fist for veggies, your cupped hand for carbs, and your thumb for fats. For more about this strategy visit **www.precisionnutrition.com/calorie-control-guide**

I'M A MESOMORPH

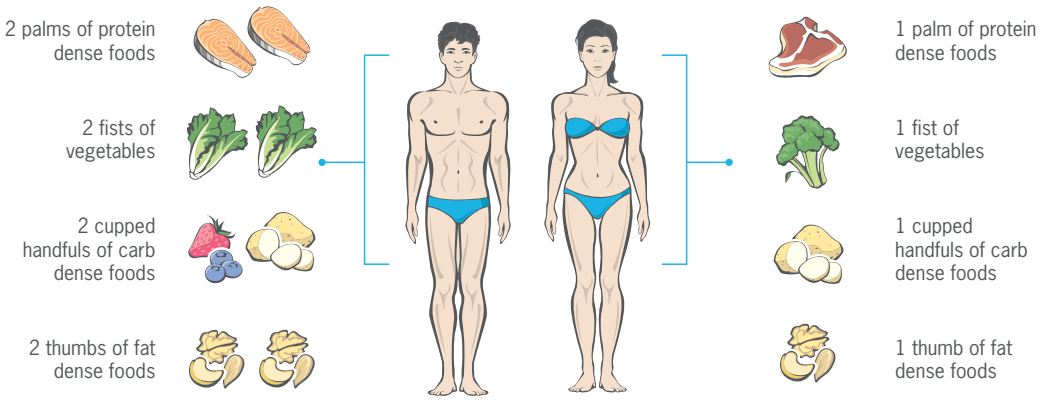
I'm generally athletic looking with a medium-sized frame. I seem to gain muscle and stay lean easily. **I'm usually trying to optimize my physique or boost my sports performance.**

WHEN TO EAT

BEFORE EXERCISE	DURING EXERCISE	AFTER EXERCISE
Eat "mesomorph meal" 1-2 hours before activity	**For weight gain:** *1 P+C drink or BCAAs* **For sport performance:** *1 P+C drink* **For fat loss:** *BCAAs or water* **For body recomposition:** *BCAAs or water* **For maintenance:** *BCAAs or water*	Eat "mesomorph meal" 1-2 hours after activity

THE MESOMORPH MEAL

USE YOUR HAND TO MEASURE



WHAT IS A P+C DRINK?

In some cases you'll want to use a protein + carbohydrate (P+C) drink during exercise. **For every hour of training, you'll have:**

15 g protein
(½ scoop protein powder)

+

30-45 g carbs
(2 cups of juice or sports drink)

I'M AN ENDOMORPH

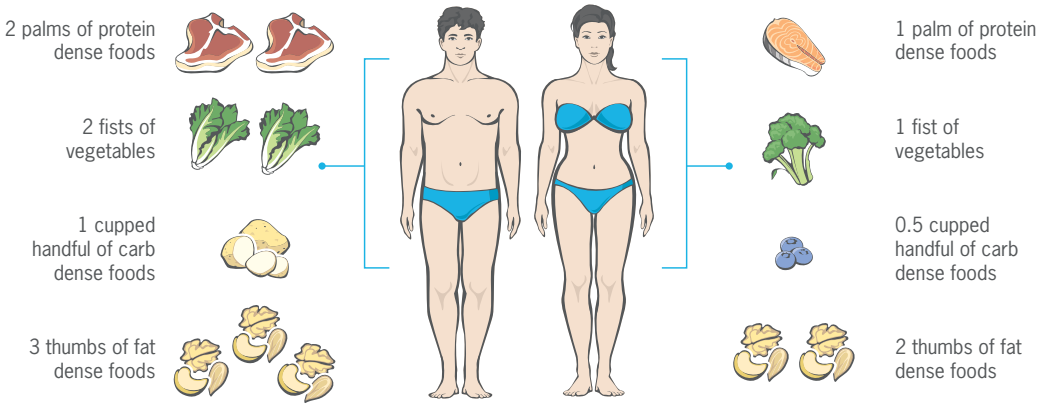
I generally have a large frame and am heavier than most. I have a slower metabolism and don't tolerate carbs as well. **I'm usually trying to lose fat or support my strength.**

WHEN TO EAT

BEFORE EXERCISE	DURING EXERCISE	AFTER EXERCISE
Eat "endomorph meal" 1-2 hours before activity	**For weight gain:** *BCAAs or water* **For strength support:** *BCAAs or water* **For fat loss:** *BCAAs or water* **For body recomposition:** *BCAAs or water* **For maintenance:** *BCAAs or water*	Eat "endomorph meal" 1-2 hours after activity

THE ENDOMORPH MEAL

USE YOUR HAND TO MEASURE



WHAT ARE BCAAs?

Branched chain amino acids (BCAA) can also be used during exercise. BCAAs come in liquid, powder, or pill form. Aim for 10-15 g per hour of training.

PrecisionNutrition

WORKOUT NUTRITION EXPLAINED

What to eat before, during, and after exercise.

By John Berardi and Brian St. Pierre

We all know that *what* you eat is important. But what about *when* you eat? Especially if you're active?

In this article, we'll review the evidence on workout nutrition and give you practical recommendations for what to eat before, during, and after exercise.

Quick summary

By eating a healthy, well-considered meal 1-2 hours before exercise, and another healthy, well-considered meal within 1-2 hours after exercise, most people can meet their workout nutrition needs without anything else.

In other words:

If you're a healthy person who exercises regularly, you probably don't need special workout nutrition strategies.

Athletes have special needs

Of course, if you're...

- **An endurance athlete.** You train for high-level competition. You log a lot of high intensity miles each week. For you, carbohydrate and calorie needs are likely higher. You could add a protein + carbohydrate (P+C) drink during your training.

- **Training as a bodybuilder.** You lift weights with serious muscle growth in mind. You want to gain weight. Your protein and calorie needs are likely higher. You could also add a protein + carbohydrate (P+C) drink during your training.

- **Getting ready for a fitness competition.** You accumulate a lot of exercise hours. You're trying to drop to a single-digit body fat percentage. For you, carb intake should be lower. You'd benefit from the performance-enhancing, muscle-preserving branched-chain-amino acids (BCAA) during your training.

Here's a handy table that outlines our recommendations by goal and by body type.

Workout nutrition guidelines by goal and body type

Body type	General goal	Pre-workout	During workout	Post-workout
Ectomorph	Muscle gain or endurance support	Eat normally 1-2h prior	1 P+C drink, BCAA drink, or water during	Eat normally 1-2h after
Mesomorph	Physique optimization or intermittent sport support	Eat normally 1-2h prior	1 P+C drink, BCAA drink, or water during	Eat normally 1-2h after
Endomorph	Fat loss or strength sport support	Eat normally 1-2h prior	1 BCAA drink or water during	Eat normally 1-2h after

Average people: Focus on food quality & quantity

Remember:

- if you're exercising for general health and fitness;
- if your goals are more modest; and/or
- you don't have unique physiological needs...

...then **you** *probably don't need any particular workout nutrition strategies.*

Focus on:

- eliminating nutrient deficiencies;
- ensuring your portions are the right size; and
- starting to eating right for your body type.

Not everyone needs nutrient timing

These days, even women's magazines like *Cosmopolitan* recommend exercise drinks to help with hydration and recovery. Nutrient timing, they say, is important for every exerciser.

Well, we hesitate to disagree with the eminent sports nutrition pros staffing lifestyle magazines, but most people don't need to worry about nutrient timing. Ever.

At Precision Nutrition, we've worked with over 45,000 people through our coaching programs. This experience, combined with the latest scientific evidence, suggests that **for most people trying to look and feel their best, nutrient timing is not a main priority.**

Indeed, for a lot of people, stressing out about:

- when to eat their carbs;
- when to eat their fats; and
- what to eat in and around their workouts...

...can be distracting, even self-sabotaging.

(For other people, nutrient timing actually gives them a framework for making good food decisions and controlling total intake. Of course, if that's you, rock on with the nutrient timing!)

Context matters

Remember, *we're not saying nutrient timing is good or bad here.*

It certainly can, and often does, work.

But **nutrient timing is** *just one tool.* **Like every tool, it has to be used skillfully, in the right way and in the right situation.**

What's true for the pre-diabetic office worker who's never exercised is certainly not true for the serious endurance runner or the long-time bodybuilder. In fact, the people who stand to benefit most from specific nutritional strategies around their workouts are athletes.

So, in the end, if you're reading this as an athlete, or a serious exerciser – or a trainer/coach who works with these populations – know that these strategies could help make a difference.

Nutrient timing isn't magic

Nutrient timing won't suddenly transform your physique or performance. This is especially true if you aren't yet doing basic good habits *consistently*.

Workout nutrition in detail

For those of you interested in learning more, let's dig in.

First we'll cover what's happening during the pre-exercise, during-exercise, and post-exercise time periods.

Then we'll share what to eat to get the most out of them.

Pre-exercise nutrition needs

What and when you eat **before exercise** can make a big difference to your performance and recovery.

In the three hours before your workout, you'll want to eat something

that helps you:

- sustain energy;
- boost performance;
- hydrate;
- preserve muscle mass; and
- speed recovery.

Here are a few ways to ensure you're meeting your requirements.

Protein before exercise

Eating some protein in the few hours before exercise:

- **Can help you maintain or even increase your muscle size.** That's important for anyone who wants to improve health, body composition, or performance.

- **Can reduce markers of muscle damage** (myoglobin, creatine kinase, and myofibrillar protein degradation). Or at least prevent them from getting worse. (Carbohydrates or a placebo eaten before exercise don't seem to do the same thing.) The less damage to your muscles, the faster you recover, and the better you adapt to your exercise over the long term.

- **Floods your bloodstream with amino acids just when your body needs them most.** This boosts your muscle-building capabilities. So not only are you preventing damage, you're increasing muscle size.

Before you rush off to mix a protein shake: While protein before a workout is a great idea, speed of digestion doesn't seem to matter

much. So any protein source, eaten within a few hours of the workout session, will do the trick.

Carbs before exercise

Eating carbs before exercise:

- **Fuels your training and helps with recovery.** It's a popular misconception that you only need carbs if you're engaging in a long (more than two hour) bout of endurance exercise. In reality, carbs can also enhance shorter term (one hour) high-intensity training. So unless you're just going for a quiet stroll, ensuring that you have some carbs in your system will improve high intensity performance.

- **Preserves muscle and liver glycogen.** This tells your brain that you are well fed, and helps increase muscle retention and growth.

- **Stimulates the release of insulin.** When combined with protein, this improves protein synthesis and prevents protein breakdown. Another reason why a mixed meal is a great idea. No sugary carb drinks required.

Fats before exercise

Fats before exercise:

- **Don't appear to improve nor diminish sport performance.** And they don't seem to fuel performance — that's what carbs are for.

- **Do help to slow digestion,** which maintains blood glucose and

insulin levels and keeps you on an even keel.

- **Provide some vitamins and minerals,** and they're important in everyone's diet.

Pre-exercise nutrition in practice

With these things in mind, here are some practical recommendations for the pre-exercise period.

Depending on what suits your individual needs, you can simply have normal meal in the few hours before exercise. Or you can have a smaller meal just before your exercise session. (If you're trying to put on mass, you may even want to do both.)

Option 1: 2-3 hours before exercise

This far in advance of your workout, have a mixed meal and a low-calorie beverage like water.

If you're a man, here's what your meal might look like:

If you're a woman, here's what your meal might look like.

Note: Your actual needs will vary depending on your size, goals, genetics, and the duration and intensity of your activity.

For example, an endurance athlete preparing for a 20 mile run will need more carbs than someone getting ready for a 45 minute gym session.

Option 2: 0-60 minutes before training

Rather than eating a larger meal 2-3 hours before exercise, some people like to eat a smaller meal closer to the session.

The only issue with that: the closer you get to your workout, the less time there is to digest. That's why we generally recommend something liquid at this time, like a shake or a smoothie.

Yours might look like this:

- 1 scoop protein powder
- 1 fist of veggies (spinach works great in smoothies)

- 1-2 cupped handfuls of carbs (berries or a banana work great)
- 1 thumb of fats (like mixed nuts or flax seeds)
- low-calorie beverage like water or unsweetened almond milk

Here's a delicious example:

- 1 scoop chocolate protein powder
- 1 fist spinach
- 1 banana
- 1 thumb peanut butter
- 8 oz. chocolate, unsweetened almond milk

It probably goes without saying, but with pre-training nutrition, choose foods that don't bother your stomach. Because... er... you know what happens if you don't.

During-exercise nutrition needs

What you eat or drink during exercise is only important under specific circumstances. But if you are going to eat during exercise, your goals will be similar to those for pre-workout nutrition. Above all, you'll want to maintain hydration.

Goals of nutrition during exercise:

- stay hydrated;
- provide immediate fuel;
- boost performance;
- preserve muscle; and

- improve recovery.

Protein during exercise

Eating protein during exercise:

- **Helps prevent muscle breakdown.** This can lead to improved recovery and greater adaptation to training over the longer term. And this is especially true if it has been more than three hours since your last meal. You only need a small amount of protein to control protein breakdown — around 15 grams per hour. If you're the type of person who prefers to exercise on an empty stomach, then 10-15 grams of BCAAs during training can be helpful.

- **Is really only necessary for some people:** athletes doing long, intense training bouts, multiple daily training sessions, and/or people trying to gain significant amounts of mass.

Carbs during exercise

Eating carbs during exercise:

- **Provides an immediate fuel source.** This helps boost performance and facilitate faster recovery. It keeps our stress hormone cortisol down, and beneficial hormones up.

- **Is only beneficial in certain circumstances:** endurance athletes on long runs, for people who want to gain a lot of muscle, and for highly active people who need every calorie they can get to increase size, strength, and/or performance.

How many carbs should you eat?

That depends. The maximum amount of carbohydrates that can be digested/absorbed during exercise is 60-70 grams per hour.

However, if you include protein in the mix, you can achieve the same endurance benefits with only 30-45 grams of carbohydrate per hour. Note: the protein also protects against muscle breakdown so it's typically a good idea to add some in.

Fats during exercise

Eating a bit of fat before and after exercise can be a great idea. (And tasty, too!) But you should try to avoid eating fats during exercise. That's because fats can be more difficult to digest. And during training, you don't want to give your stomach more work than it can handle.

During-exercise nutrition in practice

Do you need to eat during your workout?

That depends on how long it's been since your last meal and the length/type of exercise you're planning on.

Exercise lasting less than two hours

For training that's less than two hours long, the main focus should be hydration. This is especially true if you're using good pre- and post-training nutrition. So make sure you bring plenty of water.

But what about sports drinks? They don't offer much benefit for events less than two hours long. Especially if you ate a good pre-exercise meal.

There are some exceptions, though.

1. If you're exercising **in the heat and sweating a lot,** sports drinks may be useful since they have electrolytes that help speed hydration and recovery.

2. Also, if you're going to be **competing or training again in less than eight hours,** sports drinks may jumpstart recovery before the next session.

3. If you're **trying to gain maximum muscle,** then including a protein and carbohydrate drink or some BCAAs during training could provide a small advantage.

4. Finally, **at the highest end of sport or competition,** while it may not help, it certainly won't hurt to sip on a sports drink during competition to ensure maximal hydration and energy supply.

Exercise lasting more than two hours

For training that is longer than two hours, sports drinks can be a huge help. Every hour you'll want to consume:

- 15 grams protein
- 30-45 grams carbs

This can come in the form of liquids, gels, or even some solid food.

Many endurance athletes prefer to drink water and eat fruit and other foods to supply their energy even on really long runs. Either approach is fine, as long as you ensure you're getting enough protein, carbohydrates and electrolytes, especially sodium.

If you are exercising intensely for longer than two hours, especially in the heat, do not rely on water alone. This will decrease your performance and your recovery. And it could also lead to hyponatremia, a condition in which the sodium levels in your blood become too low. Hyponatremia causes your muscles and heart to contract erratically, and can even lead to death.

Under these conditions, when you're sweating a lot, go with sports drinks.

Post-exercise nutrition needs

Now let's take a look at post-exercise nutrition.

Post-workout nutrition can help you:

- recover;
- rehydrate;
- refuel;
- build muscle; and
- improve future performance.

Protein after exercise

Eating protein after exercise prevents protein breakdown and stimulates synthesis, leading to increased or maintained muscle tissue. So it's a great strategy for better recovery, adaptation, and performance.

In the past, most fitness experts recommended fast acting proteins like whey or casein hydrolysate. This is because early research indicated

that the more quickly amino acids get to your muscles, the better the result.

However, new research shows that hydrolyzed, fast-digesting proteins may get into our systems too fast. Because they're in and out of the bloodstream so quickly, they might not maximize protein synthesis or maximally inhibit protein breakdown after all.

What's more, hydrolyzed casein is preferentially taken up by the splanchnic bed (i.e. our internal organs). Which means it isn't maximally effective for improving protein synthesis elsewhere.

And the protein you ate before training is still peaking in your bloodstream, so how quickly this protein gets there doesn't really matter.

In other words, there's no real evidence that protein powders, especially the fast-digesting kind, are any better for us than whole food protein after training.

They're probably not worse either. Which means you can choose whichever type of protein you want for your post-workout meal.

Want fast and convenient? Make an awesome post-workout protein shake.

Want real food? Then make an awesome high-protein meal.

Any high quality complete protein should do the job, as long as you eat enough. That means about 40-60 grams for men (or 2 palms) and 20-30 grams for women (1 palm).

Carbs after exercise

Contrary to popular belief, it's unnecessary to stuff yourself with refined carbohydrates and sugars to "spike" insulin and theoretically restore muscle and liver glycogen as rapidly as possible after your workout.

In fact, a blend of minimally processed whole food carbohydrates, along with some fruit (to better restore or maintain liver glycogen) is actually a better choice, because:

- it's better tolerated;
- it restores glycogen equally over a 24-hour time period; and
- it might lead to better next-day performance.

Endurance athletes who perform two glycogen-depleting sessions within eight hours of one another might be an exception to this guideline, as speed of glycogen replenishment is critical in that situation. But for most healthy exercisers, whole food with some fruit is a better way to go.

Research shows that muscle protein breakdown is most inhibited and muscle protein synthesis happens best when insulin is at 15-30 mU/L. This is only about three times above fasting levels of 5-10 mU/L.

These levels are easily reached if you eat a mixed meal or drink a Super Shake a few hours before and after training. Plus, with mixed meals, your levels should stay at this rate for about four hours after consumption.

Fats after exercise

Dogma has it that we should avoid fats after exercise because they slow the digestion and absorption of nutrients.

While this is true, in most cases, it's also irrelevant. We've already seen that speed of digestion of protein and carbs is not necessarily as important as we once thought. The same with fats.

In fact, one study compared what happens when people drink skim milk rather than whole milk after training. Participants drank either 14 oz. of skim milk or 8 oz. of whole milk (that equalized the calories, for those of you who love calorie math).

The skim milk drinkers got the same number of calories — along with six extra grams of protein. So you'd think they'd have the advantage.

Yet the whole milk drinkers actually ended up with a higher net protein balance! And the researchers had no explanation other than the fat content of the whole milk.

Additional research shows that eating as much as 55 grams of fat post-training, and another 55 grams in the two subsequent meals did not get in the way of glycogen replenishment compared to lower fat meals with the same amount of carbohydrates.

Clearly, fat doesn't reduce the benefits of protein and carbohydrate consumption around training. In fact, it actually might provide some benefits of its own!

Post-exercise nutrition in practice

While you don't have to rush in the door and straight to the fridge

the minute you finish at the gym, you shouldn't dawdle and poke around forever before eating. Failing to eat within a two-hour window following training can slow recovery.

But this is context dependent; what you ate before your workout influences things.

If your pre-training meal was a small one or you ate it several hours before training, then it's probably more important for you to get that post-workout meal into your system pretty quickly. Probably within an hour.

If you trained in a fasted state (say, first thing in the morning before breakfast) then it's also a good idea to chow down as soon after your workout as you can.

But if you ate a normal sized mixed meal a couple of hours before training (or a small shake closer to training), then you have a full one to two hours after training to eat your post-workout meal and still maximize the benefits of workout nutrition.

So go ahead — spend an hour in the kitchen cooking up a feast.

0-2 hours after exercise

The approach to recover from training is the same as your preparation for a workout: Have a mixed meal of real food.

Again, here's how men might build it:

- 2 palms of protein;
- 2 fists of vegetables;
- 2 cupped handfuls of carbs;

- 2 thumbs of fats;
- low-calorie beverage like water.

And here's how women might build it:

- 1 palm of protein;
- 1 fist of vegetables;
- 1 cupped handful of carbs;
- 1 thumb of fats;
- low-calorie beverage like water.

Sometimes after training you might not feel hungry. And that's okay. If you don't feel like eating, you can go with liquid nutrition.

Make a Super Shake using the same hand-sized portion guidelines as discussed above.

Conclusion

In the end, there's no perfect pre-and-post-training feeding regimen for everyone.

What to eat is always context specific.

The protein, carbohydrate, fat, and fluid requirements for a 155 lb. endurance athlete in the midst of marathon training vs. a 225 lb. bodybuilder recovering from a heavy resistance-training session are quite different.

Times of your training year will also dictate different needs in the post-exercise recovery period. That same bodybuilder will need a different approach when he starts to diet in preparation for a contest.

For most of us, people without athletic competitions on the horizon, the best pre- and post-training meals will contain some combination of high quality protein, high quality carbohydrates, healthy fats, and some fruit and vegetables.

These whole foods provide an awesome blend of nutrients: protein, carbohydrates, fats, fiber, vitamins, minerals, antioxidants, and phytonutrients that build muscle, supply energy, decrease inflammation, and boost recovery.

Of course, you can eat solid foods or drink smoothies. And the amount of each macronutrient can vary depending on your needs as well as personal preferences and tolerances.

In terms of timing, you have about one to two hours on both sides of your training to still get maximal benefit.

And, according to the most recent data, the total amount of protein and carbohydrate consumed over the course of the day is far more important to lean mass gain, fat loss, and performance improvements than any specific nutrient timing strategy.

So enjoy your workout. And your meals.

Want to learn more?

If you'd like to learn more about helping people find the best way of eating for them, check out our Precision Nutrition Level 1 Certification program; the next group kicks off soon.

The Precision Nutrition Level 1 Certification gives you the knowledge, systems, and tools you need to build a rewarding career as a fitness and nutrition coach.

Developed over 10 years, and proven with more than 100,000 clients, our curriculum stands alone as the authority on the science of nutrition and the art of coaching.

Whether you're already mid-career, or just starting out, the Level 1 Certification is your springboard to a deeper understanding of nutrition, the authority to coach it, and the ability to turn what you know into results.

Visit this link for more information:
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[Of course, if you're already a student or graduate of the Level 1 Certification, check out our Level 2 Certification, an exclusive year-long Master Class for elite professionals looking to take their nutrition knowledge and coaching techniques to the highest possible level.]