

Your Fuel System

Glucose, glycogen, fat, and ketones without the science lecture.

YOUR RESULT

Understand what changes between meals - and what a timer cannot know.

24 guided pages | four learning modules | one 7-day practice

[START HERE](#)

START HERE

A real course, built for ordinary days

What you will be able to do

Understand what changes between meals - and what a timer cannot know.

Understand the idea

Your body does not run on one fuel at a time. It continuously adjusts the mix of glucose, stored carbohydrate, fatty acids, and ketones according to recent food, activity, sleep, hormones, and individual physiology. The phrase metabolic switch can be useful shorthand, but it becomes misleading when an app presents a single exact hour as a proven biological event.

Use it in real life

This course explains the fuel system without asking you to memorize biochemistry. You will learn what glycogen does, why fat use can rise during a fasting period, how ketones fit into the picture, and why consumer timers cannot know exactly what is happening in your tissues.

Know the boundary

The practical goal is better interpretation. A phase label can remind you that time has passed, but it should not pressure you to continue when unwell or promise a result that was never measured. Use schedule, symptoms, meal quality, sleep, and professional advice for decisions that affect health.

BEFORE YOU BEGIN

The timer never outranks your health

This material is general education. It cannot diagnose a condition, adjust medication, or decide whether fasting is appropriate for you.

Get individualized guidance first

Do this before fasting if you are pregnant or breastfeeding, under 18, underweight, have an eating-disorder history, use glucose-lowering or blood-pressure medicine, need food with medication, or have a condition affected by fluid, electrolytes, or meal timing.

End the fast and respond

Stop if you feel faint, confused, severely dizzy, unusually weak, or otherwise unwell. Sit or lie down if needed, address immediate needs, and do not drive or continue hazardous activity while impaired.

Seek urgent help for severe symptoms

Chest pain, fainting, severe confusion, trouble breathing, new neurological symptoms, suicidal thoughts, or symptoms that feel dangerous need urgent appropriate care. A timer, streak, or online guide should never delay it.

Protect your relationship with food

Reduce or stop fasting and tracking if they increase food preoccupation, guilt, bingeing, purging, compulsive exercise, hiding behavior, or the urge to compensate. Qualified eating-disorder support matters more than finishing this course.

YOUR NON-NEGOTIABLE

If I feel unsafe or unwell, I stop and get the right help.

COURSE MAP

Four modules, then a one-week practice

1

Your body uses a fuel mix

2

Glycogen is stored glucose

3

Fat use and ketones can rise

4

Phase labels are estimates

PLAIN-LANGUAGE GLOSSARY

Glucose

A circulating sugar used by many tissues as fuel.

Glycogen

Stored carbohydrate, especially in liver and muscle.

Fatty acid

A component of stored or dietary fat that can be used for energy.

Ketone

A fuel made by the liver when fatty-acid supply and metabolic conditions favor production.

Substrate oxidation

The use of a fuel source in energy-producing pathways.

Metabolic flexibility

The ability to adjust fuel use as supply and demand change.

How to use the next 12 pages

Read the explanation, walk through the example, then write only what helps. You do not need to finish every prompt in one sitting.

MODULE 1

Your body uses a fuel mix

The simple version

Your body does not run on one fuel at a time. It uses a changing mix of glucose, stored glycogen, fat, and sometimes more ketones.

The fuller explanation

Even after a carbohydrate-containing meal, the body can use some fat; during a fasting period, some tissues still use glucose. Hormones and enzymes shift the proportions rather than operating a binary switch. This is why a statement such as now burning fat is incomplete. Fat use occurs across the day, and net body-fat change depends on energy balance and behavior over time, not a single app phase.

A picture to keep in mind

It is like a hybrid car blending fuel sources, not flipping one switch.

THREE IDEAS TO KEEP

- 1 Several fuels overlap.
- 2 The mix changes gradually.
- 3 People change at different rates.

Why this matters

Understanding the idea helps you choose a smaller, safer action instead of following a dramatic claim or a perfect-looking number.

WORKED EXAMPLE

See your body uses a fuel mix in real life

A realistic example

Two people finish dinner at 8:00 p.m. One ate a larger carbohydrate-rich meal and rested the next morning. The other ate less carbohydrate and took a long walk. Their stored fuel use and ketone production may differ even when both timers show hour 14. The same person may also respond differently on separate days. Elapsed time is only one input.

The common mistake

The common mistake is imagining a locked door that opens at a precise hour. That picture encourages people to chase the label instead of evaluating the whole plan. Replace the sentence the switch flips with the fuel mix gradually changes. The revised wording is less dramatic and more scientifically honest.

A THREE-STEP DECISION

1. Name the facts

Describe what is happening now, including symptoms, schedule, food access, sleep, medication, and other relevant context.

2. Compare the options

Ask which option respects safety, real constraints, and the purpose of the plan. A longer or stricter option is not automatically better.

3. Choose and review

Take the smallest useful action, then note what happened. Change one variable at a time when possible.

TRY THIS

Replace the phrase 'the switch flips' with 'the fuel mix slowly changes.'

Success means you tested one useful action - not that the day looked perfect.

WORKBOOK

Turn the idea into your own plan

Before you write

The point of this page is not to produce perfect answers. It is to make 'Your body uses a fuel mix' specific enough to use. Write short phrases. Use facts from a normal week, and leave any question blank if it does not help. Keep this warning in view: The common mistake is imagining a locked door that opens at a precise hour. That picture encourages people to chase the label instead of evaluating the whole plan. Replace the sentence the switch flips with the fuel mix gradually changes. The revised wording is less dramatic and more scientifically honest.

1

Explain 'Your body uses a fuel mix' in your own plain words.

2

What in your current routine already supports this idea?

3

What one real constraint could make the ideal version difficult?

4

Which reminder is most useful today: Several fuels overlap. / The mix changes gradually. / People change at different rates.

5

Complete the plan: If the day changes, I will still replace the phrase 'the switch flips' with 'the fuel mix slowly changes.'

One sentence to carry forward

I can use this idea without making the plan harsher.

MODULE 2

Glycogen is stored glucose

The simple version

After eating, some glucose is stored as glycogen in the liver and muscles. Liver glycogen helps support blood glucose between meals.

The fuller explanation

Liver glycogen helps maintain blood glucose between meals. Muscle glycogen mainly supports the muscle in which it is stored. These stores are not one shared tank, and their use varies with recent diet and activity. As liver glycogen availability falls, the body can increase other fuel pathways, but there is no home method that converts a clock reading into an exact glycogen percentage.

A picture to keep in mind

Glycogen is a small cupboard, not an endless warehouse.

THREE IDEAS TO KEEP

- 1 Meals refill stores.
- 2 Activity uses fuel.
- 3 Liver and muscle stores have different jobs.

Why this matters

Understanding the idea helps you choose a smaller, safer action instead of following a dramatic claim or a perfect-looking number.

WORKED EXAMPLE

See glycogen is stored glucose in real life

A realistic example

A person does a long evening workout and then eats a modest dinner. Another person rests and eats a large dinner. Both begin fasting at 9:00 p.m. Their morning experience and substrate use may not match. This does not mean one person won the fast. It means the preceding day changed the starting conditions.

The common mistake

A common mistake is deliberately exhausting glycogen to force a faster transition. Combining long fasting, hard exercise, low food intake, and poor recovery can increase fatigue and make the plan less sustainable. Exercise should serve a broader health plan, not be used as punishment or as a way to unlock a timer badge.

A THREE-STEP DECISION

1. Name the facts

Describe what is happening now, including symptoms, schedule, food access, sleep, medication, and other relevant context.

2. Compare the options

Ask which option respects safety, real constraints, and the purpose of the plan. A longer or stricter option is not automatically better.

3. Choose and review

Take the smallest useful action, then note what happened. Change one variable at a time when possible.

TRY THIS

Notice how meal size and activity could change the next fasting day.

Success means you tested one useful action - not that the day looked perfect.

WORKBOOK

Turn the idea into your own plan

Before you write

The point of this page is not to produce perfect answers. It is to make 'Glycogen is stored glucose' specific enough to use. Write short phrases. Use facts from a normal week, and leave any question blank if it does not help. Keep this warning in view: A common mistake is deliberately exhausting glycogen to force a faster transition. Combining long fasting, hard exercise, low food intake, and poor recovery can increase fatigue and make the plan less sustainable. Exercise should serve a broader health plan, not be used as punishment or as a way to unlock a timer badge.

1

Explain 'Glycogen is stored glucose' in your own plain words.

2

What in your current routine already supports this idea?

3

What one real constraint could make the ideal version difficult?

4

Which reminder is most useful today: Meals refill stores. / Activity uses fuel. / Liver and muscle stores have different jobs.

5

Complete the plan: If the day changes, I will still notice how meal size and activity could change the next fasting day.

One sentence to carry forward

I can use this idea without making the plan harsher.

MODULE 3

Fat use and ketones can rise

The simple version

As time without food increases, fat release and use can rise. The liver may make more ketones. The timing and amount depend on the person and situation.

The fuller explanation

As fasting continues, fatty-acid availability and ketone production can rise. Ketones are real molecules with measurable concentrations, but detecting them does not prove that a diet is ideal, that body fat loss is occurring at a particular rate, or that every proposed fasting benefit is active. The concentration depends on multiple factors and is not inferred accurately from elapsed time alone.

A picture to keep in mind

The dimmer turns slowly. It is not an on-off light.

THREE IDEAS TO KEEP

- 1 Timing varies.
- 2 More is not always better.
- 3 A timer is not a meter.

Why this matters

Understanding the idea helps you choose a smaller, safer action instead of following a dramatic claim or a perfect-looking number.

WORKED EXAMPLE

See fat use and ketones can rise in real life

A realistic example

An app labels hour 14 as ketosis. A person reads the label, but no blood or breath measurement was taken. The appropriate interpretation is that the app is showing a general educational estimate. It is not a measurement of that person's ketones. The person can still end the fast based on the planned schedule or symptoms without losing a medically proven advantage.

The common mistake

The common mistake is using a ketone reading or phase label as a grade. Higher is not automatically better, and ketones can have different meanings in different medical contexts. People with diabetes or medication concerns need individualized guidance because dangerous metabolic states cannot be managed by a wellness timer.

A THREE-STEP DECISION

1. Name the facts

Describe what is happening now, including symptoms, schedule, food access, sleep, medication, and other relevant context.

2. Compare the options

Ask which option respects safety, real constraints, and the purpose of the plan. A longer or stricter option is not automatically better.

3. Choose and review

Take the smallest useful action, then note what happened. Change one variable at a time when possible.

TRY THIS

When you see an exact-hour claim, ask what was actually measured.

Success means you tested one useful action - not that the day looked perfect.

WORKBOOK

Turn the idea into your own plan

Before you write

The point of this page is not to produce perfect answers. It is to make 'Fat use and ketones can rise' specific enough to use. Write short phrases. Use facts from a normal week, and leave any question blank if it does not help. Keep this warning in view: The common mistake is using a ketone reading or phase label as a grade. Higher is not automatically better, and ketones can have different meanings in different medical contexts. People with diabetes or medication concerns need individualized guidance because dangerous metabolic states cannot be managed by a wellness timer.

1

Explain 'Fat use and ketones can rise' in your own plain words.

2

What in your current routine already supports this idea?

3

What one real constraint could make the ideal version difficult?

4

Which reminder is most useful today: Timing varies. / More is not always better. / A timer is not a meter.

5

Complete the plan: If the day changes, I will still when you see an exact-hour claim, ask what was actually measured.

One sentence to carry forward**I can use this idea without making the plan harsher.**

MODULE 4

Phase labels are estimates

The simple version

An app can explain common physiology. It cannot see your liver glycogen, ketone level, insulin level, or autophagy. Phase labels are education, not test results.

The fuller explanation

Phase labels are usually generated from elapsed time and broad educational assumptions. They do not include your meal composition, liver glycogen, physical activity, insulin response, illness, alcohol intake, sleep, or laboratory measurements. A responsible label should therefore be read as may be shifting rather than is definitely happening.

A picture to keep in mind

A weather app can estimate rain. It cannot tell whether your sleeve is wet.

THREE IDEAS TO KEEP

- 1 Use phases as context.
- 2 Do not treat them as proof.
- 3 Symptoms still come first.

Why this matters

Understanding the idea helps you choose a smaller, safer action instead of following a dramatic claim or a perfect-looking number.

WORKED EXAMPLE

See phase labels are estimates in real life

A realistic example

When a screen says fat-burning phase, ask three questions: What was measured? In whom? How certain is the timing? If the answer is only time on a clock, treat the label as a simple illustration. Use it to learn vocabulary, not to decide whether to ignore dizziness, delay medication, or extend a fast.

The common mistake

The common mistake is believing precision in the interface equals precision in biology. A time stamp such as 14:00 looks exact, but the underlying estimate may be broad. Good design can explain uncertainty without making the information useless. Your safest decision still comes from a realistic plan and appropriate health guidance.

A THREE-STEP DECISION

1. Name the facts

Describe what is happening now, including symptoms, schedule, food access, sleep, medication, and other relevant context.

2. Compare the options

Ask which option respects safety, real constraints, and the purpose of the plan. A longer or stricter option is not automatically better.

3. Choose and review

Take the smallest useful action, then note what happened. Change one variable at a time when possible.

TRY THIS

Write one timer label you will now read as an estimate.

Success means you tested one useful action - not that the day looked perfect.

WORKBOOK

Turn the idea into your own plan

Before you write

The point of this page is not to produce perfect answers. It is to make 'Phase labels are estimates' specific enough to use. Write short phrases. Use facts from a normal week, and leave any question blank if it does not help. Keep this warning in view: The common mistake is believing precision in the interface equals precision in biology. A time stamp such as 14:00 looks exact, but the underlying estimate may be broad. Good design can explain uncertainty without making the information useless. Your safest decision still comes from a realistic plan and appropriate health guidance.

1

Explain 'Phase labels are estimates' in your own plain words.

2

What in your current routine already supports this idea?

3

What one real constraint could make the ideal version difficult?

4

Which reminder is most useful today: Use phases as context. / Do not treat them as proof. / Symptoms still come first.

5

Complete the plan: If the day changes, I will still write one timer label you will now read as an estimate.

One sentence to carry forward

I can use this idea without making the plan harsher.

PUT IT TOGETHER

A messy day is where the plan matters

The situation

An app says 'fat-burning phase' at hour 14. Your friend says this proves everyone enters ketosis at exactly that time.

Option A

Treat the label as a measured result.

Option B

Treat it as a simple estimate that varies by person.

The better next move

Choose B. The phase can teach a concept, but only a suitable measurement can provide a value.

Why this answer is stronger

The better choice is not the one that protects the most impressive number. It is the one that uses the available facts, respects warning signs, and keeps tomorrow workable. Notice which detail changed the decision. Then write a fallback rule now, while you are calm, so you do not have to invent one in the difficult moment.

YOUR FALLBACK RULE

CLAIM CHECK

Four shortcuts that create confusion

A myth often contains one real word and one unjustified leap. Keep the useful part, remove the guarantee, and ask what was actually measured.

Myth 1

CLAIM: The body burns only glucose before the switch.

REALITY: The body generally uses a changing mix of fuels rather than one exclusive source.

Myth 2

CLAIM: Everyone reaches ketosis at the same hour.

REALITY: Timing varies with food, activity, physiology, and how ketosis is measured.

Myth 3

CLAIM: A phase label is a body measurement.

REALITY: Most consumer labels are estimates derived from elapsed time.

Myth 4

CLAIM: More ketones always mean more fat loss.

REALITY: A concentration at one moment does not establish long-term body-fat change.

A better sentence pattern

In this study, researchers measured [outcome] in [participants] under [conditions].
The result may not apply to every person.

WHEN THE PLAN MEETS LIFE

Use the signal, then choose the response

Troubleshooting is not finding a way to force the original plan. It is identifying the actual problem and choosing the smallest response that protects health and learning.

1. A label pressures you to keep fasting

Return to the planned end time and your stop rules. The label is not a safety instruction.

2. Two sources give different switch times

Check the population, fasting protocol, meal control, activity, and actual measurement.

3. You want to test ketones

Clarify what decision the number would change and discuss medical relevance with a professional when needed.

4. You feel weak during exercise

Stop or reduce the activity, address immediate needs, and reconsider combining it with the fasting plan.

5. You see an absolute claim online

Rewrite it with measured, may, and depends, then look for direct human evidence.

Escalate instead of troubleshooting alone

Severe, persistent, or medically concerning symptoms need appropriate professional care. The app is not a substitute for assessment.

SIX QUESTIONS

Check the reasoning, not your memory

1

The body can use more than one fuel at a time.

T / F

2

Everyone runs out of glycogen at the same hour.

T / F

3

A fasting timer measures ketones.

T / F

4

The body burns only glucose before the switch.

T / F

5

Everyone reaches ketosis at the same hour.

T / F

6

A phase label is a body measurement.

T / F

ANSWER KEY

1. TRUE: Fuel use overlaps and shifts gradually.
2. FALSE: Meals, activity, health, and individual stores differ.
3. FALSE: A timer measures time.
4. FALSE: The body generally uses a changing mix of fuels rather than one exclusive source.
5. FALSE: Timing varies with food, activity, physiology, and how ketosis is measured.
6. FALSE: Most consumer labels are estimates derived from elapsed time.

DAYS 1 TO 4

Practice one small action at a time

Do not stack extra rules onto these actions. If a day does not fit, record what changed and continue with the next appropriate step.

Day 1

ACTION: Learn the four fuel words.

PREPARE: Decide when and where this will happen. Make the first step visible or easy.

NOTICE: What helped, what got in the way, and what would make tomorrow simpler?

Day 2

ACTION: Explain glycogen in one sentence.

PREPARE: Decide when and where this will happen. Make the first step visible or easy.

NOTICE: What helped, what got in the way, and what would make tomorrow simpler?

Day 3

ACTION: Notice the previous meal.

PREPARE: Decide when and where this will happen. Make the first step visible or easy.

NOTICE: What helped, what got in the way, and what would make tomorrow simpler?

Day 4

ACTION: Notice recent activity.

PREPARE: Decide when and where this will happen. Make the first step visible or easy.

NOTICE: What helped, what got in the way, and what would make tomorrow simpler?

End-of-page check

Which action deserves to be repeated before anything becomes harder?

DAYS 5 TO 7

Finish with a review, not a verdict

Day 5

ACTION: Question one exact-hour claim.

KEEP IT SMALL: Use the easiest version that still teaches you something.

WRITE ONE LINE: I noticed... / Next time I will...

Day 6

ACTION: Rewrite the claim carefully.

KEEP IT SMALL: Use the easiest version that still teaches you something.

WRITE ONE LINE: I noticed... / Next time I will...

Day 7

ACTION: Save the cheat sheet.

KEEP IT SMALL: Use the easiest version that still teaches you something.

WRITE ONE LINE: I noticed... / Next time I will...

WEEKLY REVIEW

1

What became easier after repetition?

2

Which condition made the plan harder?

3

What should stay exactly the same next week?

A useful week produced information. It did not need to produce perfection.

CHEAT SHEET

The course in five practical reminders

1

Fuel sources overlap.

2

Glycogen is stored glucose.

3

Fat use can rise gradually.

4

Ketone timing varies.

5

A timer does not measure biology.

The one rule worth keeping

Time is real. Timer phase labels are educated estimates.

How to keep using the course

Repeat the easiest useful action for another week before adding difficulty. Keep only the data that supports a clear decision. If the plan harms sleep, food adequacy, mood, safety, or daily life, make it simpler or stop. Bring medical questions to a qualified professional with the specific schedule, symptoms, medicines, and goals written down.

COURSE COMPLETE

What the evidence can - and cannot - say

Evidence note for this topic

The metabolic-switch model summarizes a gradual shift in fuel availability and cellular signaling. Human studies differ in fasting duration, energy intake, activity, and measurement method. This guide does not assign an exact switch hour because a timer alone cannot establish one.

SOURCES AND FURTHER READING

1. National Institute on Aging. Calorie restriction and fasting diets: What do we know? 2018.
2. de Cabo R, Mattson MP. Effects of Intermittent Fasting on Health, Aging, and Disease. New England Journal of Medicine. 2019. PMID 31881139.
3. Anton SD et al. Flipping the Metabolic Switch. Obesity. 2018. PMID 29086496.
4. de Cabo R, Mattson MP. Effects of Intermittent Fasting on Health, Aging, and Disease. 2019. PMID 31881139.
5. Mattson MP, Longo VD, Harvie M. Impact of intermittent fasting on health and disease processes. 2017. PMID 27810402.
6. Stekovic S et al. Alternate Day Fasting in healthy, non-obese humans. 2019. PMID 31471173.

How to read the list

When you read a claim, check who was studied, what the comparison was, how long the intervention lasted, what was directly measured, and whether the result was clinically meaningful. A mechanistic finding can be important without proving a personal outcome. A statistically significant result can still be small, short-term, or difficult to generalize.

Your next step

Save the cheat sheet.