¶ 1.1

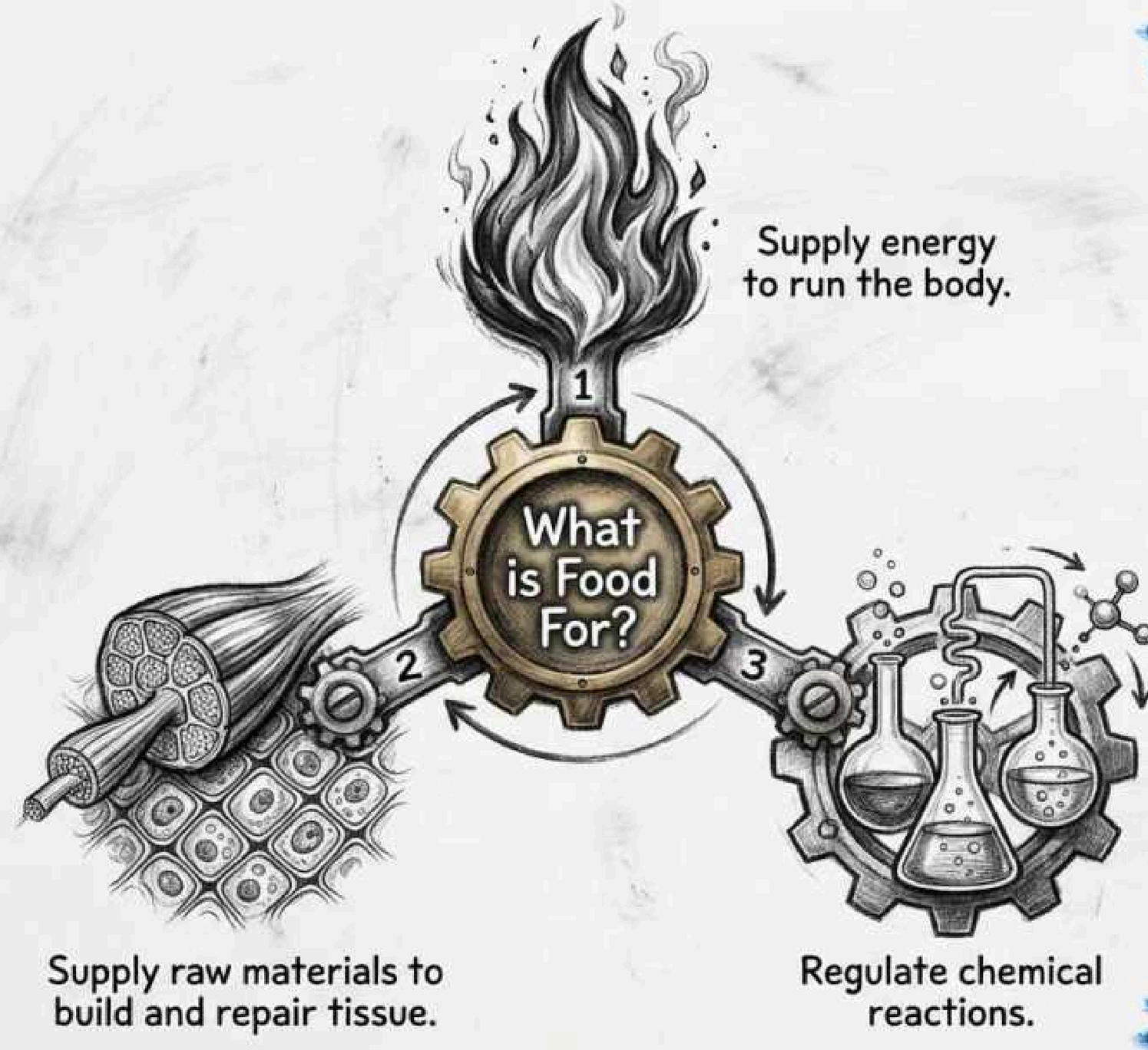


NUTR 101 B / Lecture 1: Energy and the Body

A visual exploration of metabolism, hunger, and energy.

Gemini Notebook

¶ 1.2



Nutrition = the study of how well a diet does these three jobs.

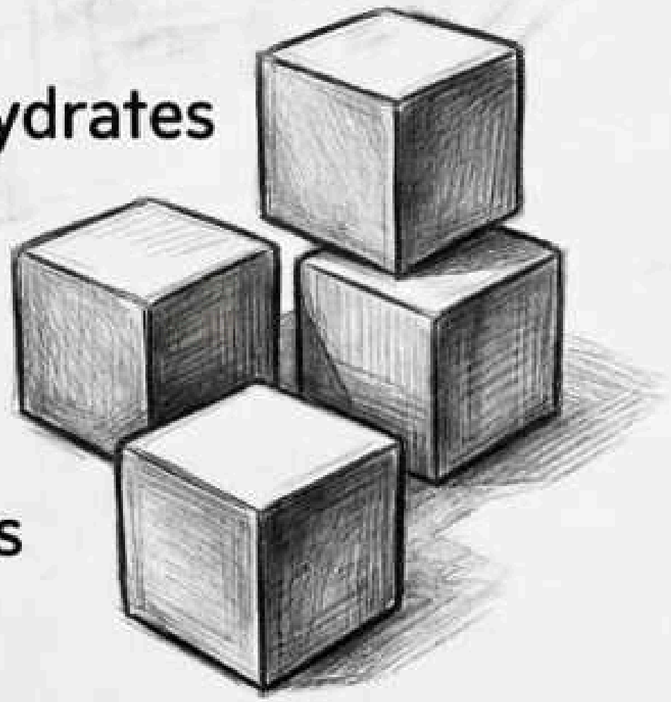
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Nutrients
(Substances the body uses)

¶ 1.3

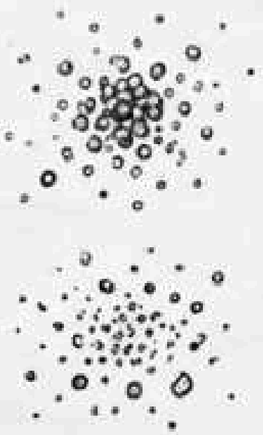
Macronutrients
(Needed in large amounts)

- Carbohydrates
- Fats
- Proteins



Micronutrients
(Needed in tiny amounts)

- Vitamins
- Minerals





Water *

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The Mathematics of Essential Nutrients

¶ 1.4

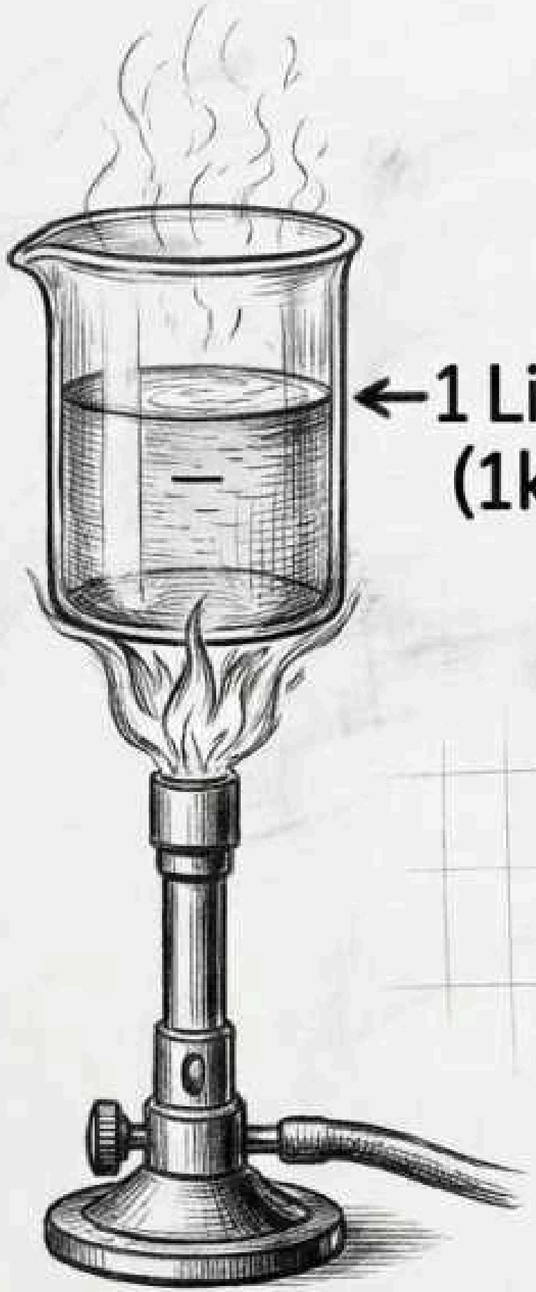
Body Synthesis Capacity < System Need → MUST come from food.

[9 Amino Acids + 2 Fatty Acids + 13 Vitamins + Many Minerals]

Diet − Essential Nutrient = Biological Suffering / System Failure.

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¶ 1.5



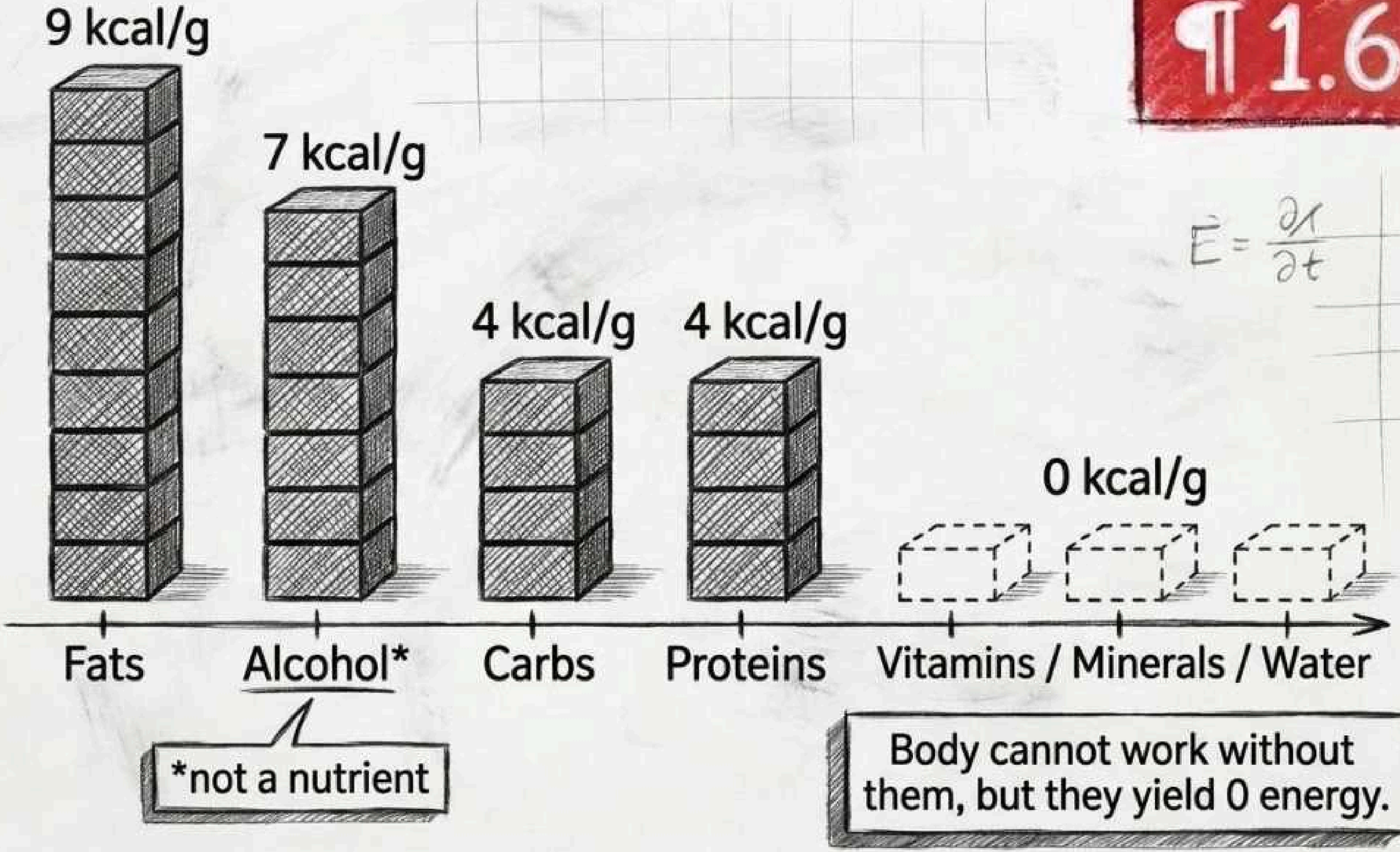
1 kcal (Food Calorie) =

Heat required to raise 1kg H_2O by 1°C

1 Food Calorie = 1,000 small calories (kilocalorie).

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¶ 1.6

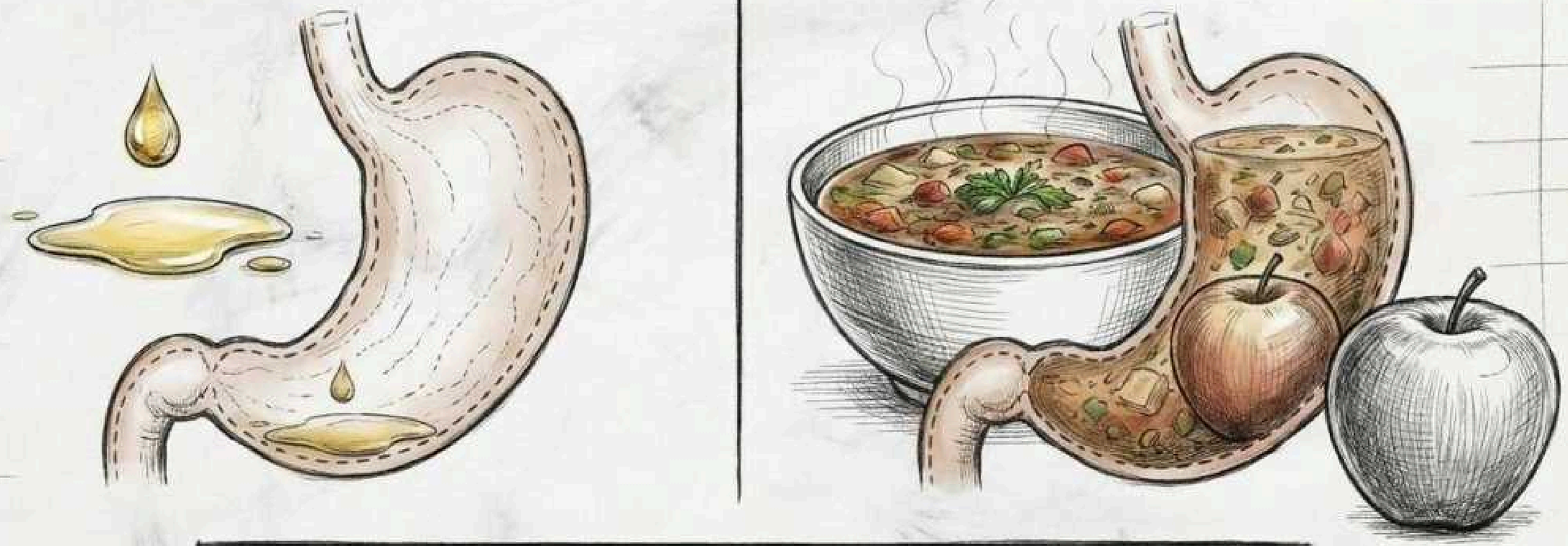


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¶ 1.7

High Energy Density

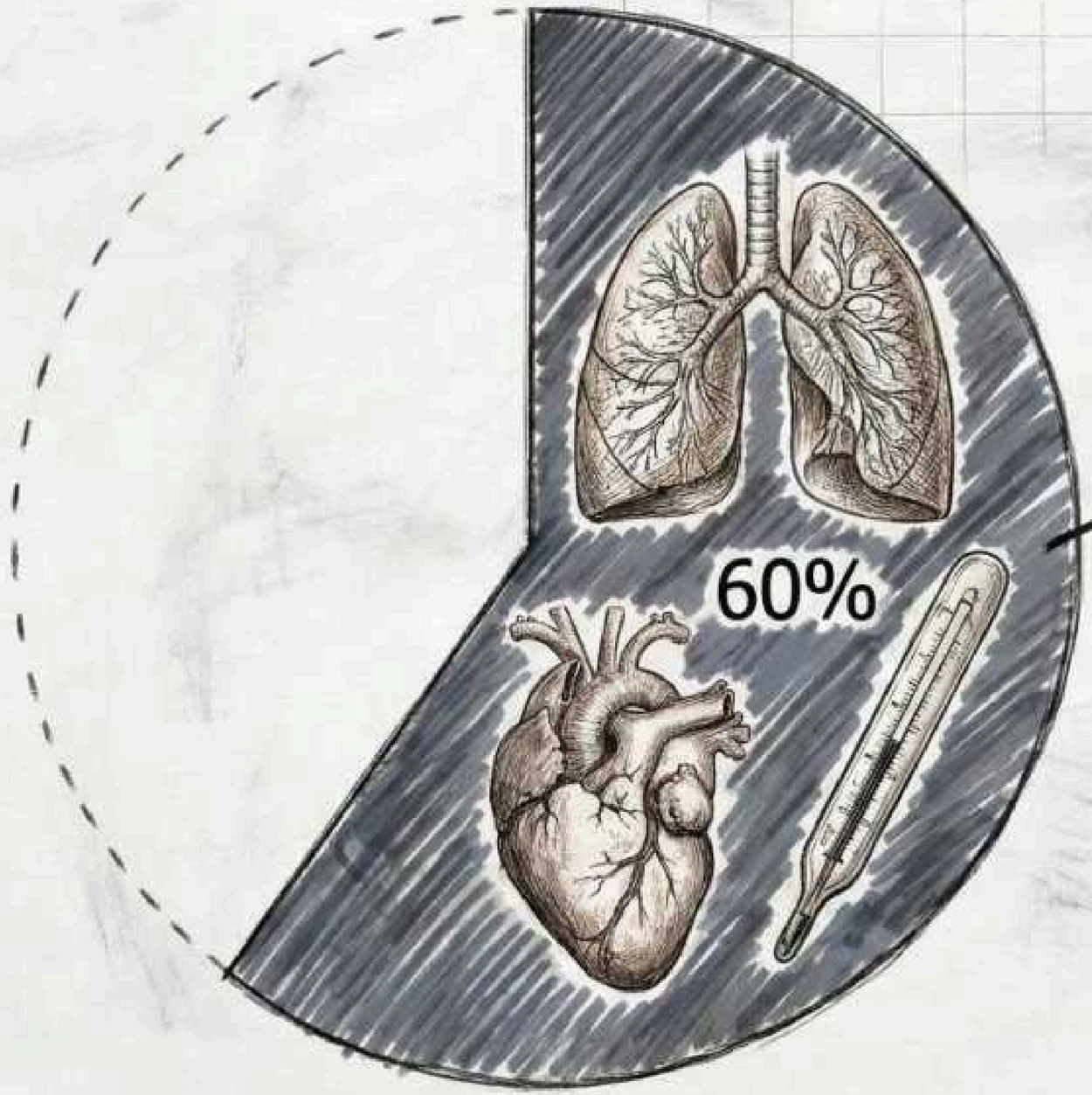
Low Energy Density



Water = Weight without Calories.
Energy density is a core tool in nutrition.

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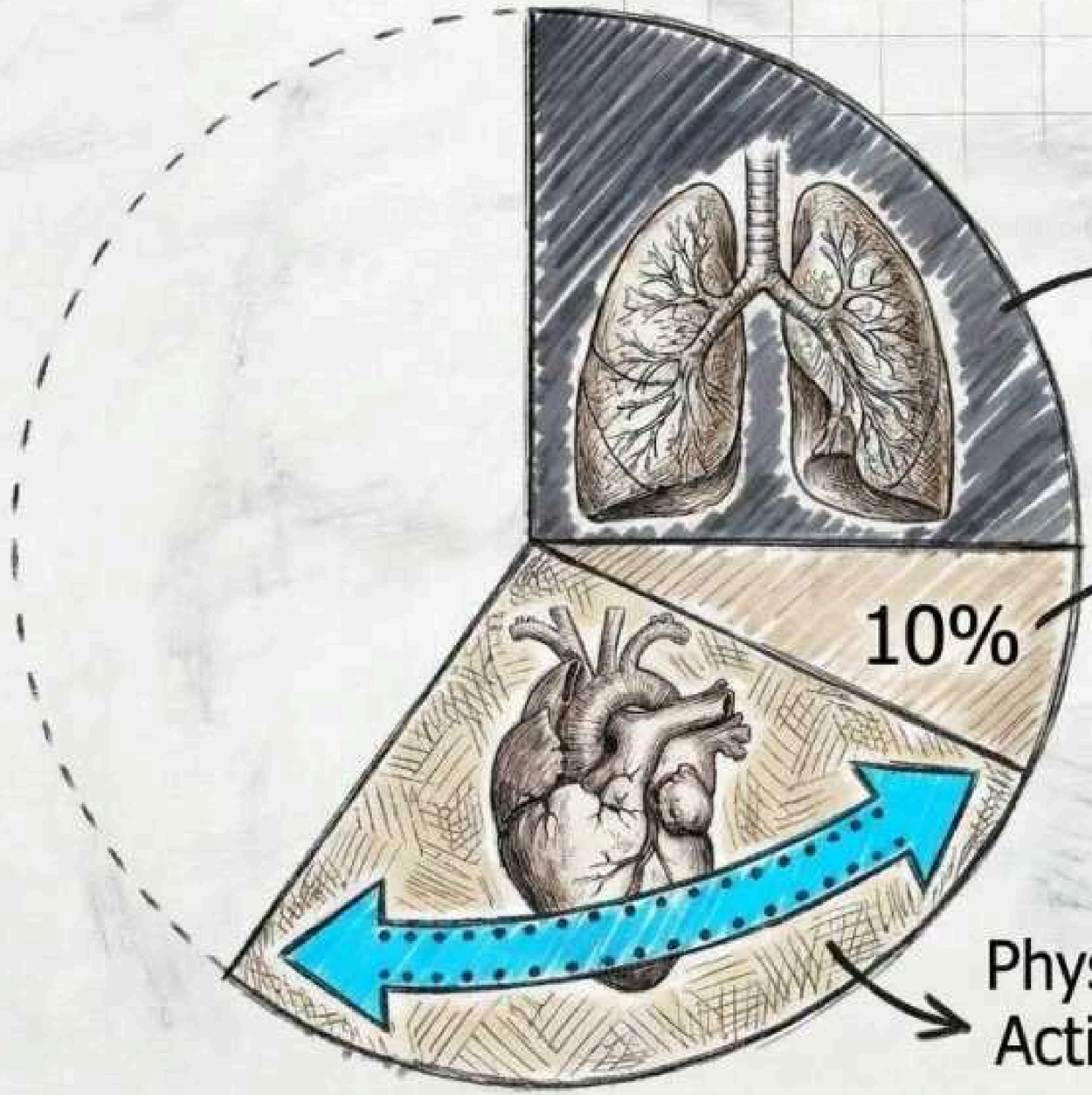
¶ 1.8



→ Basal Metabolism
(Energy needed just to stay alive at rest)

Gemini Notebook

¶1.9



Basal Metabolism
(Energy needed just to stay alive at rest)

Thermic Effect of Food
(Energy cost of digesting and absorbing a meal)

Protein processing > Fat processing

Physical Activity

From intentional exercise to fidgeting.
*This part varies most between people.**

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¶ 1.10



Dictated by:
- Age
- Sex
- Size
- Activity

Estimates for GROUPS ≠ Measurements for YOU.
Your own need can differ from the average by hundreds of calories.

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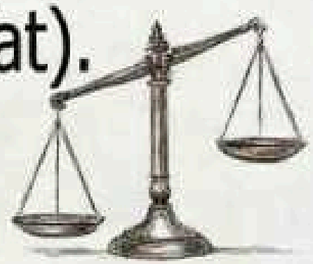
¶1.11



Intake = Use → Weight stays roughly steady.



Intake > Use → Surplus stored (mostly as fat).



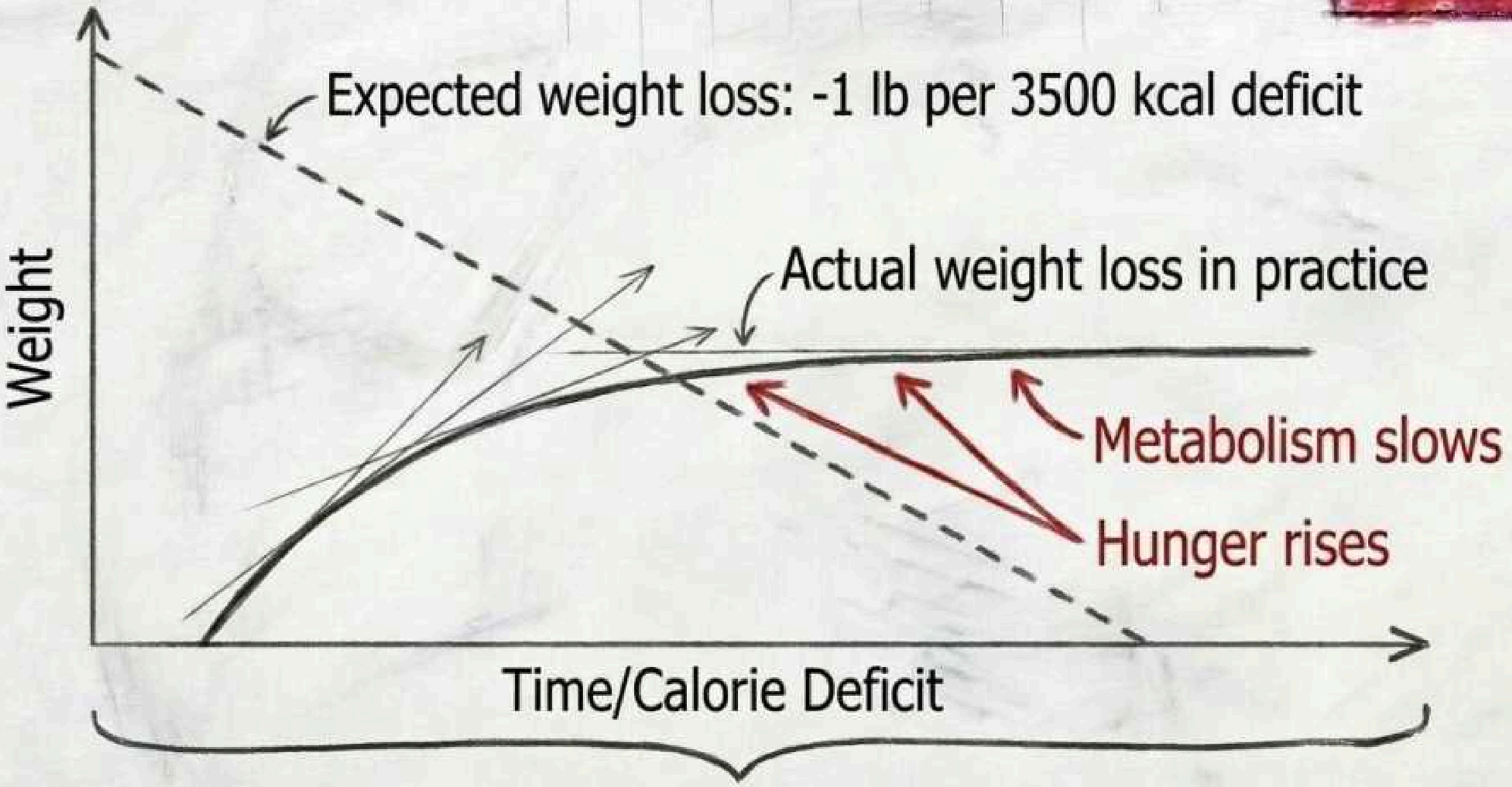
Intake < Use → Body draws on its stores.

At this level, the arithmetic is simple.

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The Limits of the 3,500-Calorie Rule

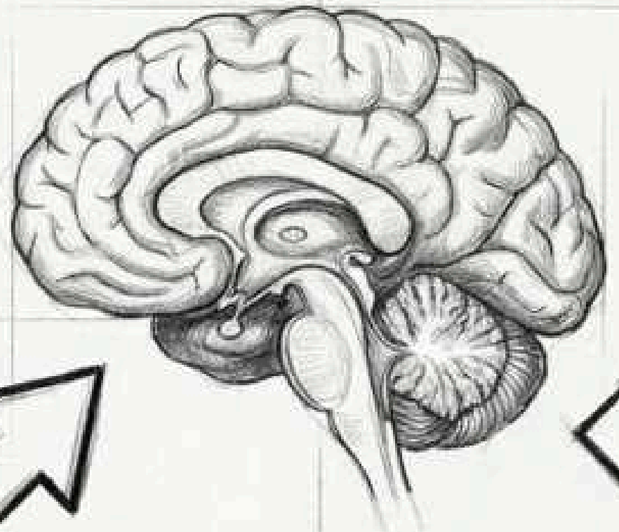
¶ 1.12



The rule overstates long-term weight loss. The body adapts.

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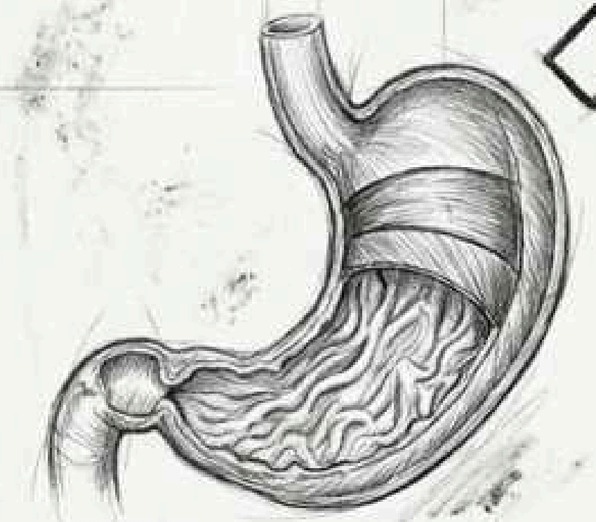
¶ 1.13

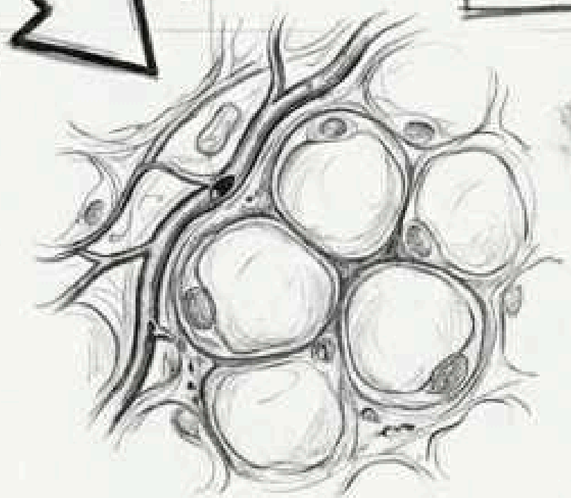


Ghrelin
(Hunger signal, rises before meals)

Leptin
(Satiety signal, indicates energy stores are adequate)

Modifiers:
Sleep
Stress
Type of food

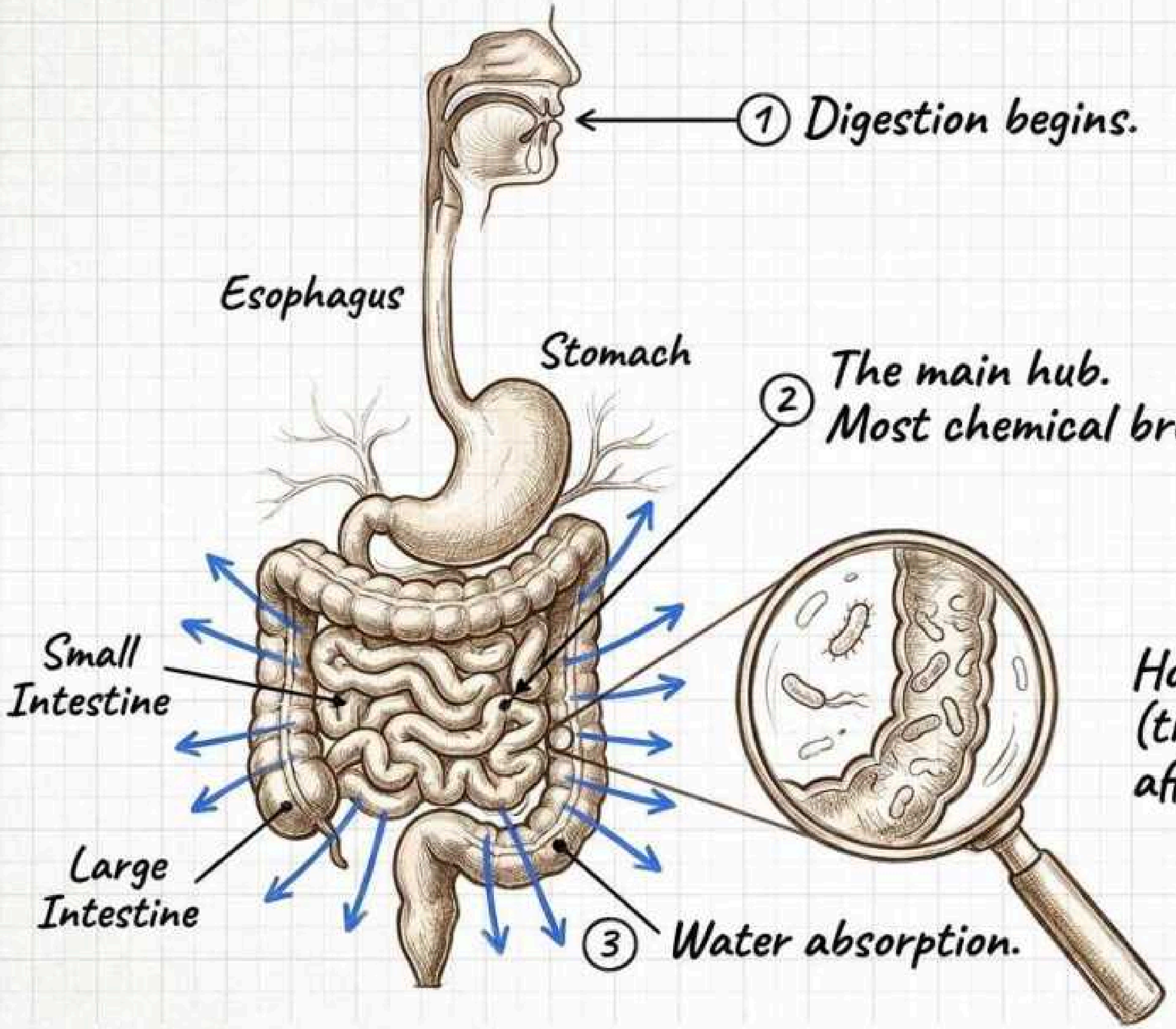




Body weight is biology, not just character or willpower.

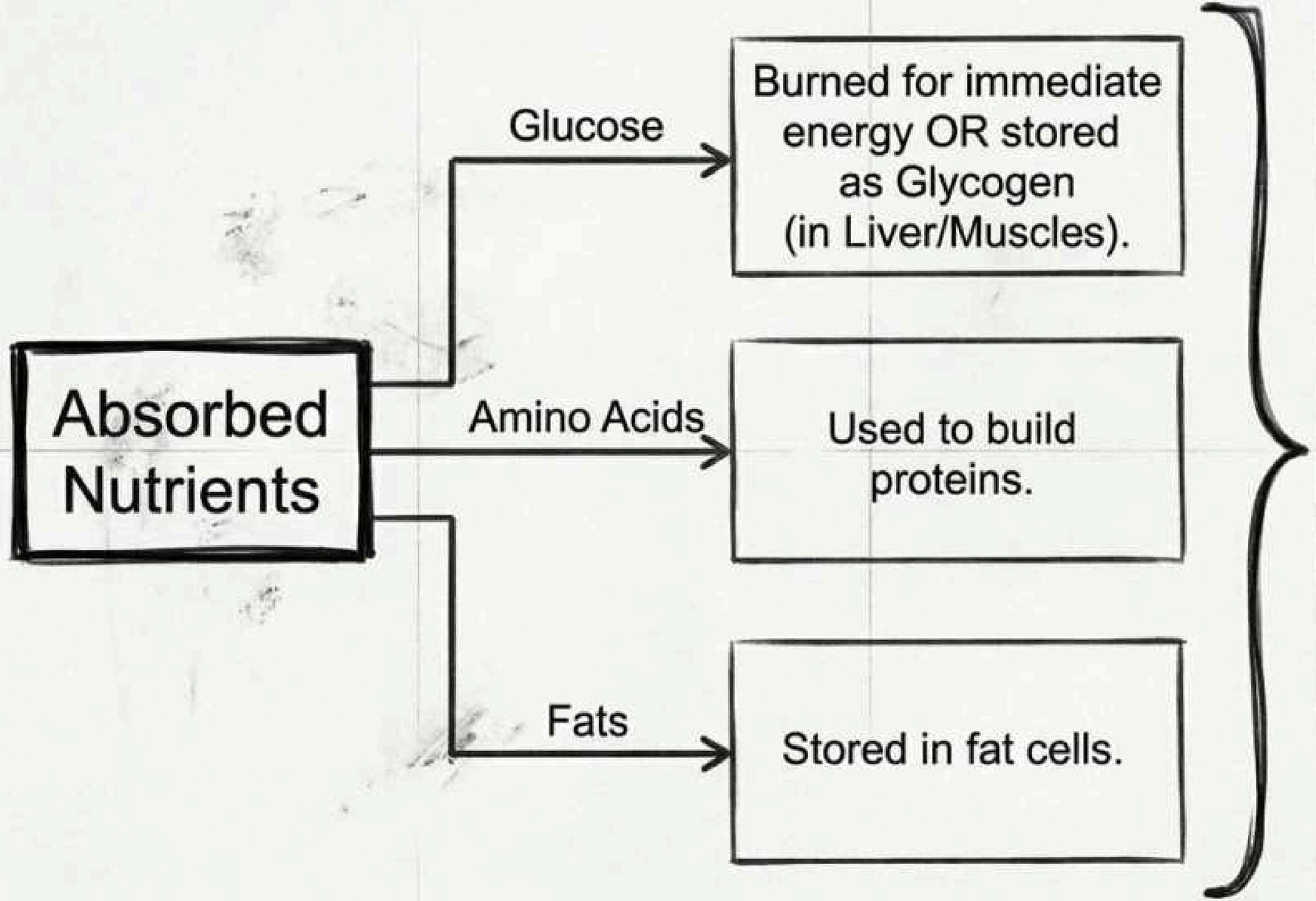
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¶ 1.14



Gemini Notebook

¶ 1.15

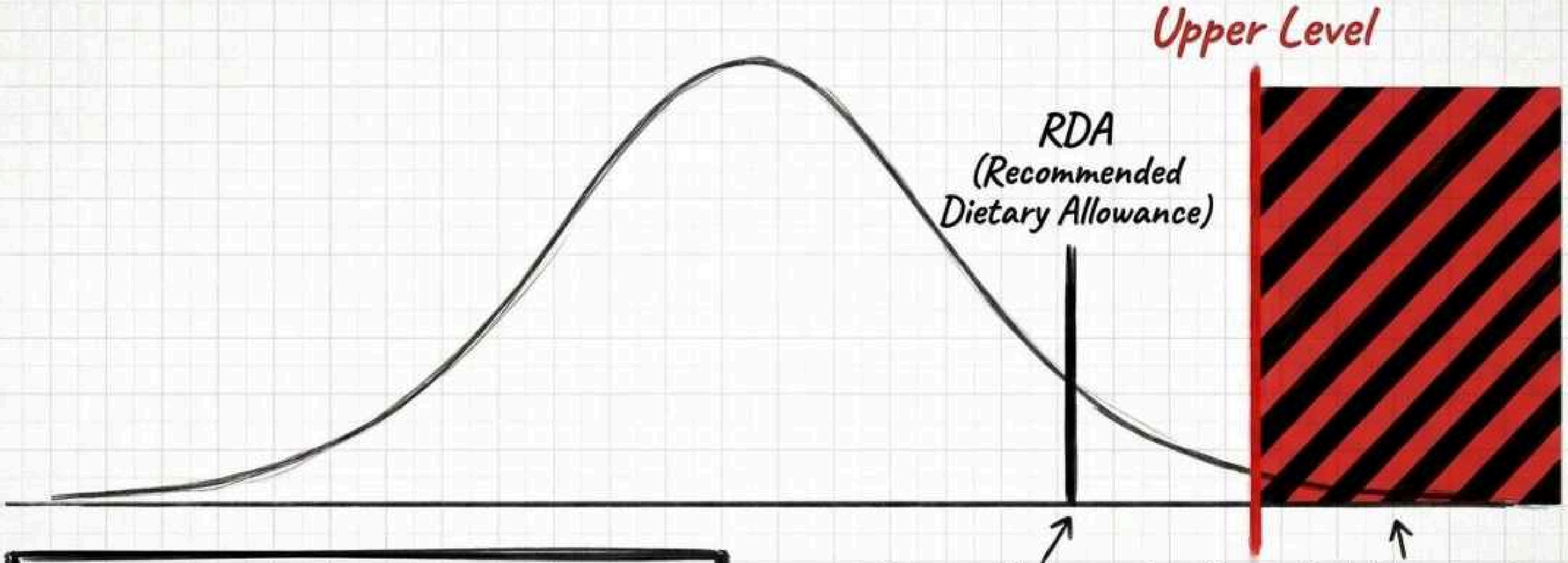


A minute-**by-mrninute** balancing act of use and storage. Nothing is wasted by design.

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¶ 1.16

DRI (Dietary Reference Intakes) - Values set by expert panels.

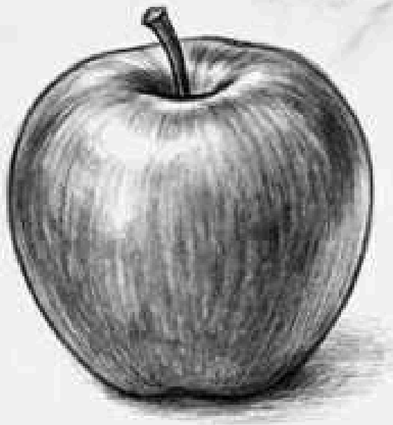


Learn these terms: every label and guideline uses them.

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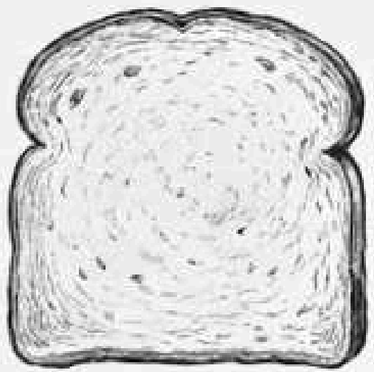
¶ 1.17

1.



Medium Apple → 95 kcal

2.



Slice of Bread → 80 kcal

3.



Can of Regular Soda → 150 kcal

4.



1 Tablespoon of Olive Oil → 120 kcal

Notice how little room the oil takes up. Small volumes of fat carry large amounts of energy—easy to forget when cooking.

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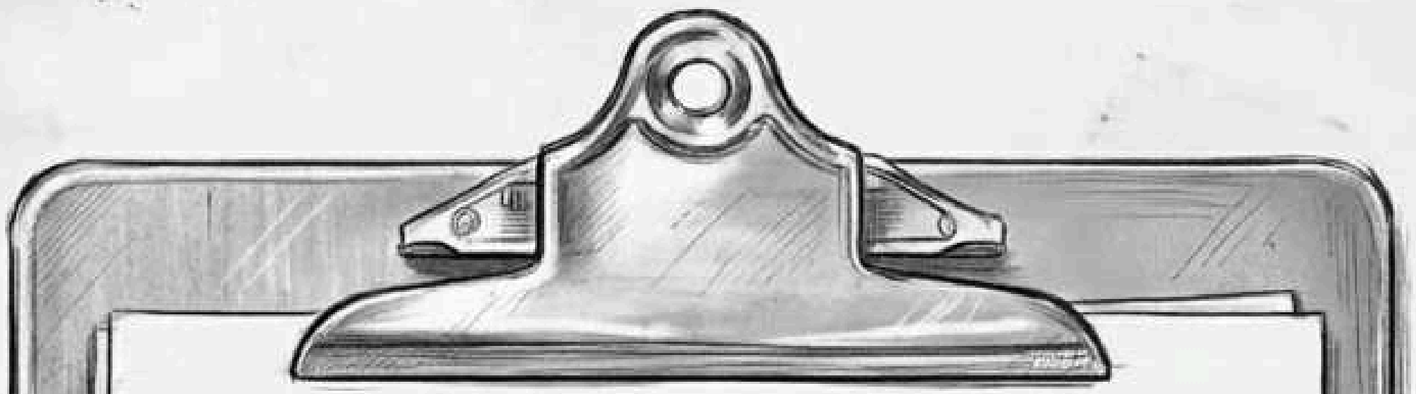
Counting calories precisely is impossible.

True Value = Label Value ± 20%

Food scientists calculate calories using standard macro factors. Regulators allow a 20% variance.



Labels are a rough guide for comparison, not an absolute measurement.



University of Minnesota, 1944 (Ancel Keys)

36 healthy young men → 6 months → 50% normal food intake.

- Obsession with eating
- Lost energy and interest in other things
- Slow recovery

The study showed that hunger is a deep biological drive, not a weakness.

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Lecture Question: How do you decide when to eat?

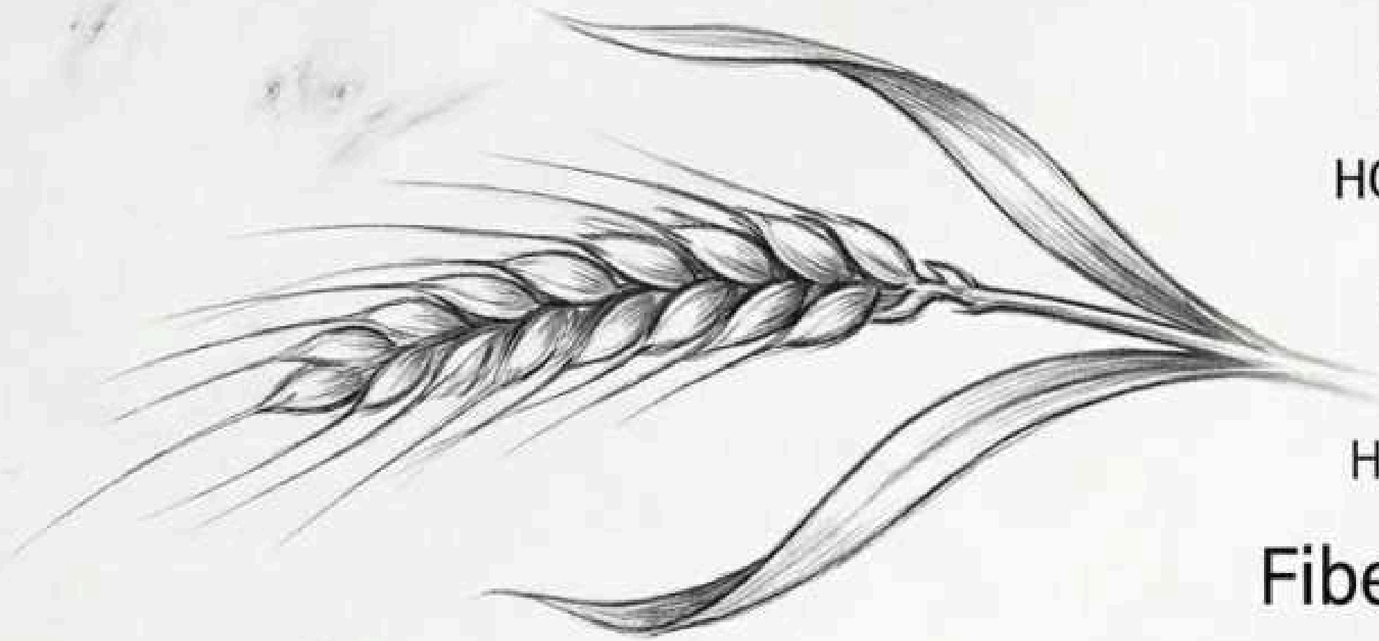
- ☐ True Hunger?
- ☐ Habit?
- ☐ The Clock?
- ☐ Social Pressure / People around you?

Write down what you notice over one day. Zero judgment.

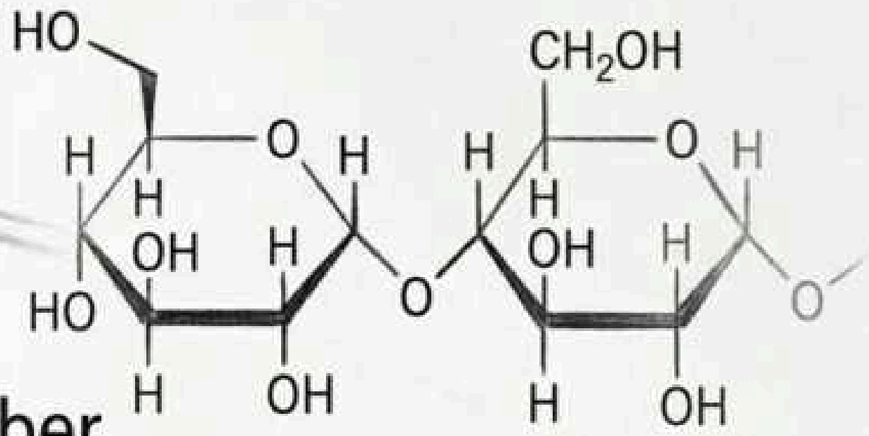
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¶ 1.21

Next: The most argued-over nutrient.



Carbohydrates



Fiber

Blood Sugar