Nutrition in Endurance and Ultra-Endurance Cycling

Tips and tricks to properly fuel your body

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Today’s agenda

- Intro
- Macronutrients - carbohydrates, proteins, fats
- Micronutrients - vitamins, minerals
- Hydration
- Sports Drinks
- Competition day

Background

The nutrients your body needs can be divided into:

- **Macronutrients** → carbohydrates, proteins, fats

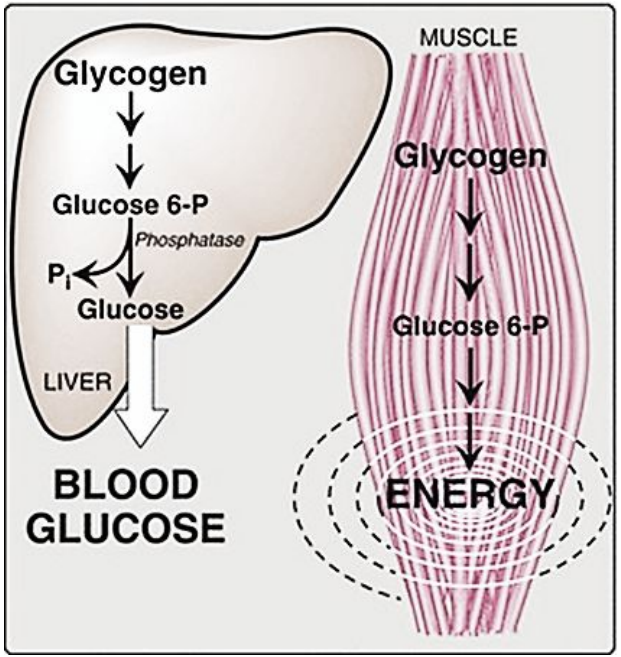
- **Micronutrients** → vitamins, minerals

Carbohydrates

What happens during intense and prolonged exercise?

Glycogen (sugar molecule) - liver, muscles

After 90 - 120 min stores are significantly depleted



Carbohydrates

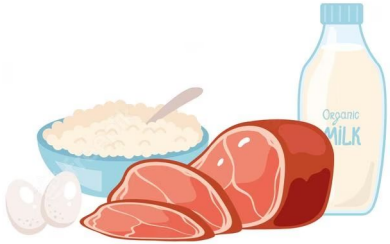
Recommended intake for endurance athletes → 70 % of the total E intake

- 7 - 10 g of carbohydrates per kg of body weight for endurance athletes
- 11 or more g of carbohydrates per kg of body weight for ultra-endurance athletes

Benefits of high-carb diet:

- Increases muscle glycogen stores
- Enhances endurance capacity

Proteins



Main function - muscle building and maintenance

Also important for building enzymes, hormones and neurotransmitters

Daily recommendations:

- 1.2 - 1.4 g of proteins per kg of body weight

Fats

Main functions - energy source, cell membrane structure, absorption of vitamins, hormone regulations, brain health.

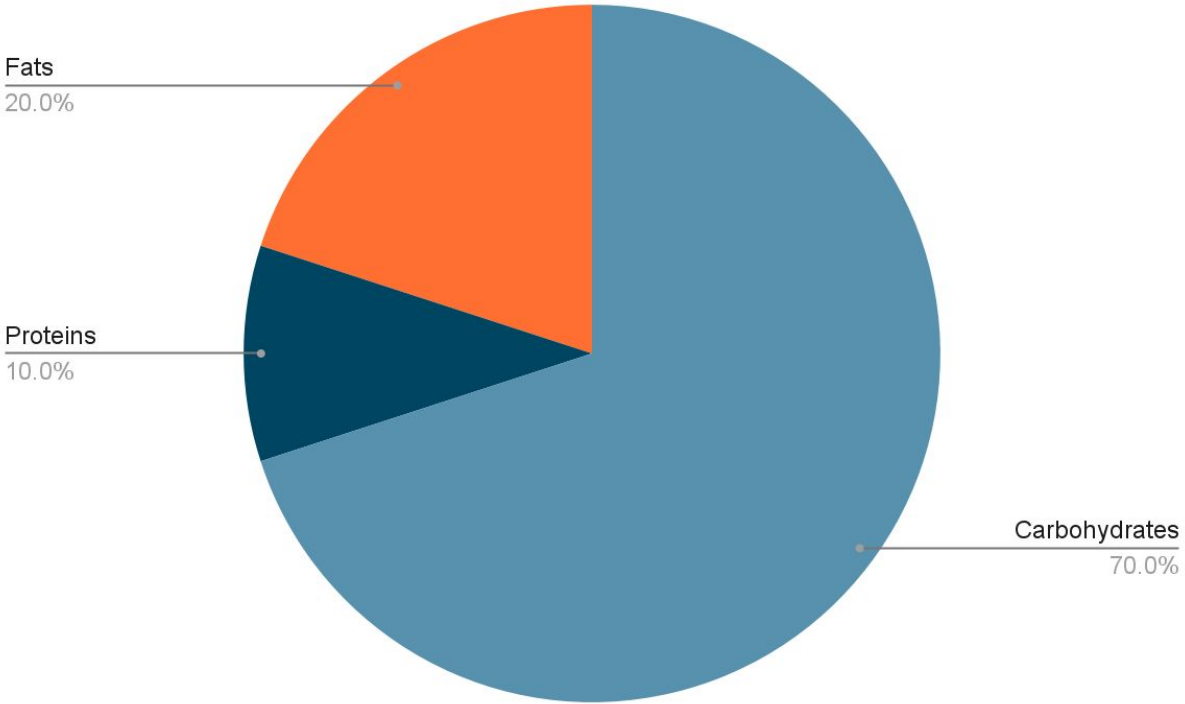
Fat types:

- unsaturated (mono- and polyunsaturated)
- saturated
- trans

Daily recommendations:

- 20 - 35 % of your total daily E intake

Your Macronutrients Requirements



Your Macronutrients Requirements

	E %	KCal	Grams
Carbohydrates	70	2800	700
Proteins	10	400	100
Fats	20	800	88-89

Micronutrients

Vitamins and **minerals**

A balanced and varied diet can provide all the micronutrients

When supplements should be considered?

- Vegetarian/vegan regimens, injury or specific medical conditions

Common deficiencies in athletes

- Iron, vitamin D, calcium, antioxidants such as vitamins E and C

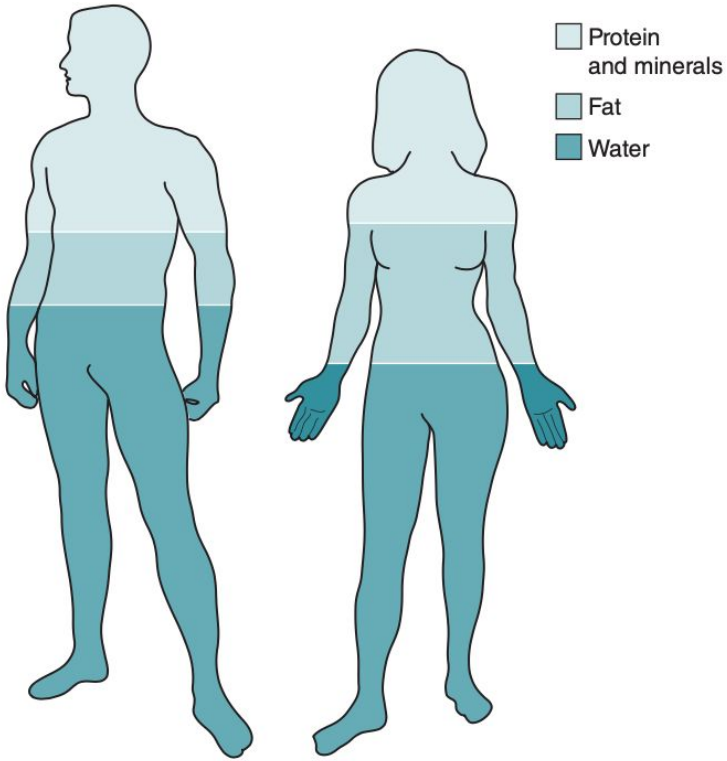
Hydration

50 - 60 % of our body is made up of water

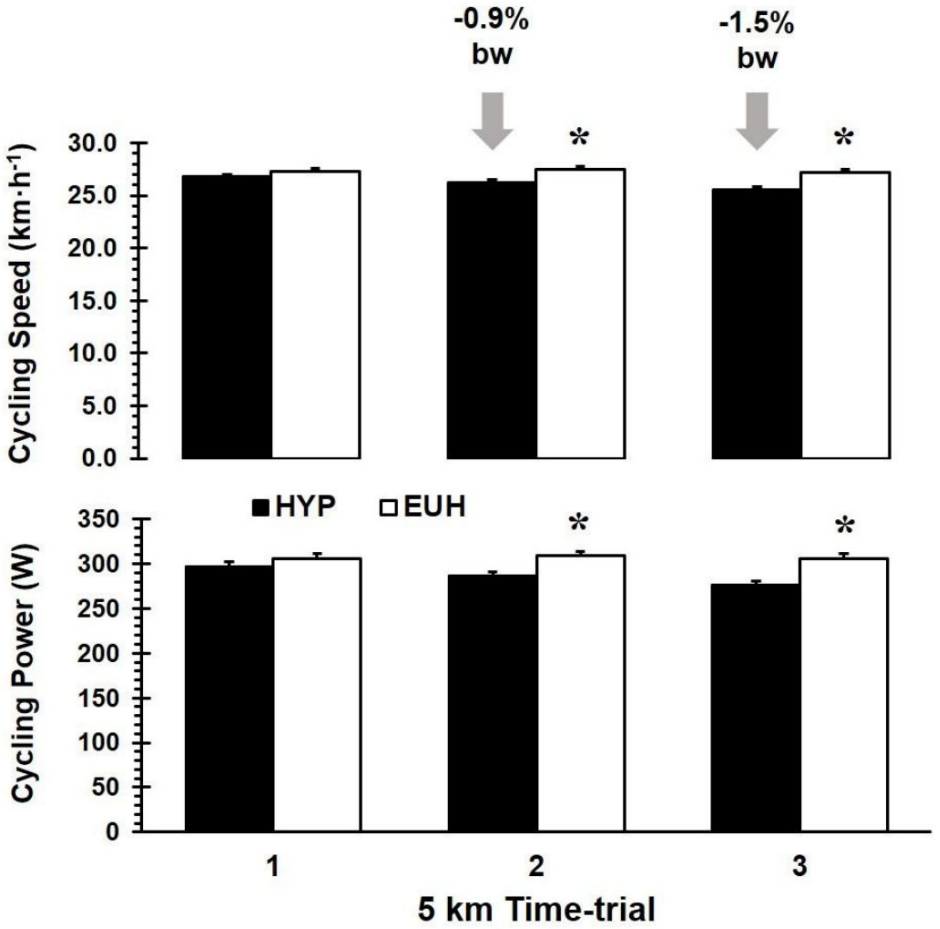
Losing only the 2 % of body mass can negatively affect your athletic performance

Body weight = 70 kg

2 % body change → loss of 1.5 L of water



Hydration



J.D. Adams et al., 2019

Hydration

How can you measure your hydration level?

1. **Body weight change**

Sweat rate (L/h) = body weight after (kg) - body weight before (kg)

Hydration

70 kg

1 h

Sweat rate = 2 L/h

68 kg

Hydration

How can you measure your hydration level?

1. **Body weight change** - fluids consumption, urines excretion

Sweat rate (L/h) = body weight difference (kg) **+ water intake (L) - urine vol (L)**

Hydration

70 kg

1 h

Sweat rate = 0.5 L/h

69 kg

Hydration

How can you measure your hydration level?

2. Urine

Hydration

Water intake before exercise

6 - 8 ml of fluid per kg of bw 2 hours before training

Other 500 ml 15 min before prolonged exercise

420 - 560 ml of water

Hydration

Water intake during exercise

In hot and humid environment → 120 - 150 ml of fluid every 15 - 20 min

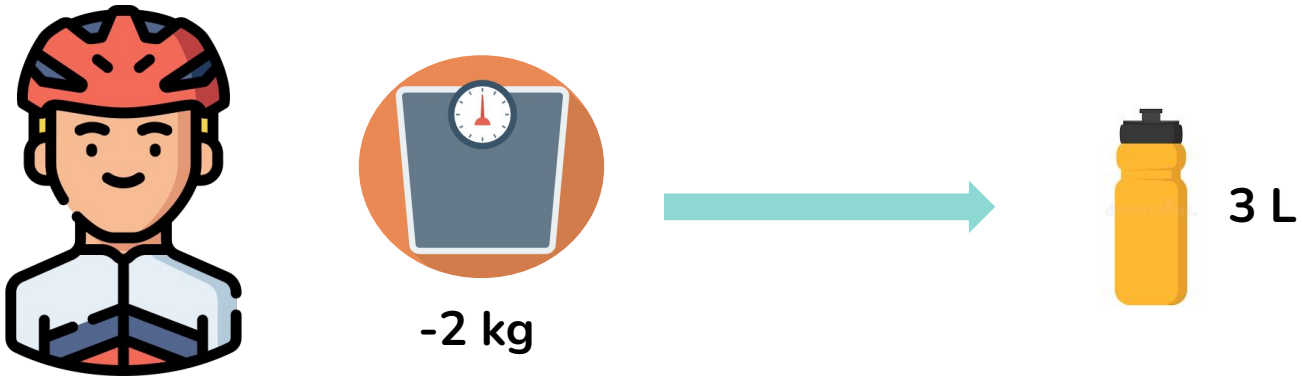
To be adjusted depending according to temperature and personal sweat rate

Do not rely on your thirsty feeling! It can be too late!

Hydration

Water intake after exercise

After intense exercise → 1.5 L of fluid for every kg of body weight lost in the hours after exercise



Hydration

Final note

These are general advices

You should take into consideration:

- Interindividual variability
- Weather conditions
- Practicality

Hydration and Sports Drinks

Only water is not enough

With sweat, you lose water, sodium, potassium, calcium, magnesium and chloride.

Additional benefits of electrolytes:

- Increase palatability
- Maintain thirst
- Prevent hyponatremia (low sodium in serum due to too much water intake)
- Increase the rate of water uptake
- Increase the retention of fluids

Hydration and Sports Drinks

Before exercise

Aim → water retention

Eat a salty snack while drinking water,

Or ingest a carbohydrate-electrolyte beverage

Hydration and Sports Drinks

During exercise

Aim → hydration and energy supply

Consume 0.1 - 0.2 g of **carbohydrates** per kg of body weight every 15 - 20 min.
Sources: either sugars, like glucose or sucrose or starches, like maltodextrins.

Include 500 - 700 ml/L of water of **sodium**.
It enhances palatability, promotes fluid retention and prevents hyponatremia

Hydration and Sports Drinks

After exercise

Aim → rehydration and replenishment of carbs and electrolytes lost

Only plain water is not ideal

It can cause a fall in plasma sodium → reduced thirst and increased urine output

- Consume up to 1.2 g of **carbs** per kg of body weight per hour
- 450 mg/L of water of **sodium**
- 75 - 95 mg/L of water of **potassium**

Competition

How should you behave in the competition week?

- Eat slightly more carbs in the day/days prior to competition → you will start with optimal glycogen stores.
- Pre-race breakfast. 3-4 h prior to competition. It is fundamental to get enough energy for the competition. Include 100 - 200 g of carbs.
- If you cannot have a full meal, eat more easy-digestible sports solid or liquid products

Competition

How should you behave in the competition week?

- **Plan** your nutrition for the race. Calculate your target of fluids, carbs and electrolytes intake.
- **Prepare** yourself. You must have a clear idea on what to eat/drink and when. This strategy must have been already tested during trainings.
- **NEVER try something new**. Race day is not the time to experiment with new products.

Competition

How can you prevent GI problems?

- Limit/avoid **fibers**. A low-fiber diet is recommended the day / the days prior to competition
- Limit/avoid **lactose**. Lactose-containing foods can cause problems in some individuals during exercise.
- Avoid **high-fructose** foods/drinks. It is mainly present in processed sweets and in some fruit juices.

References

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Questions?