

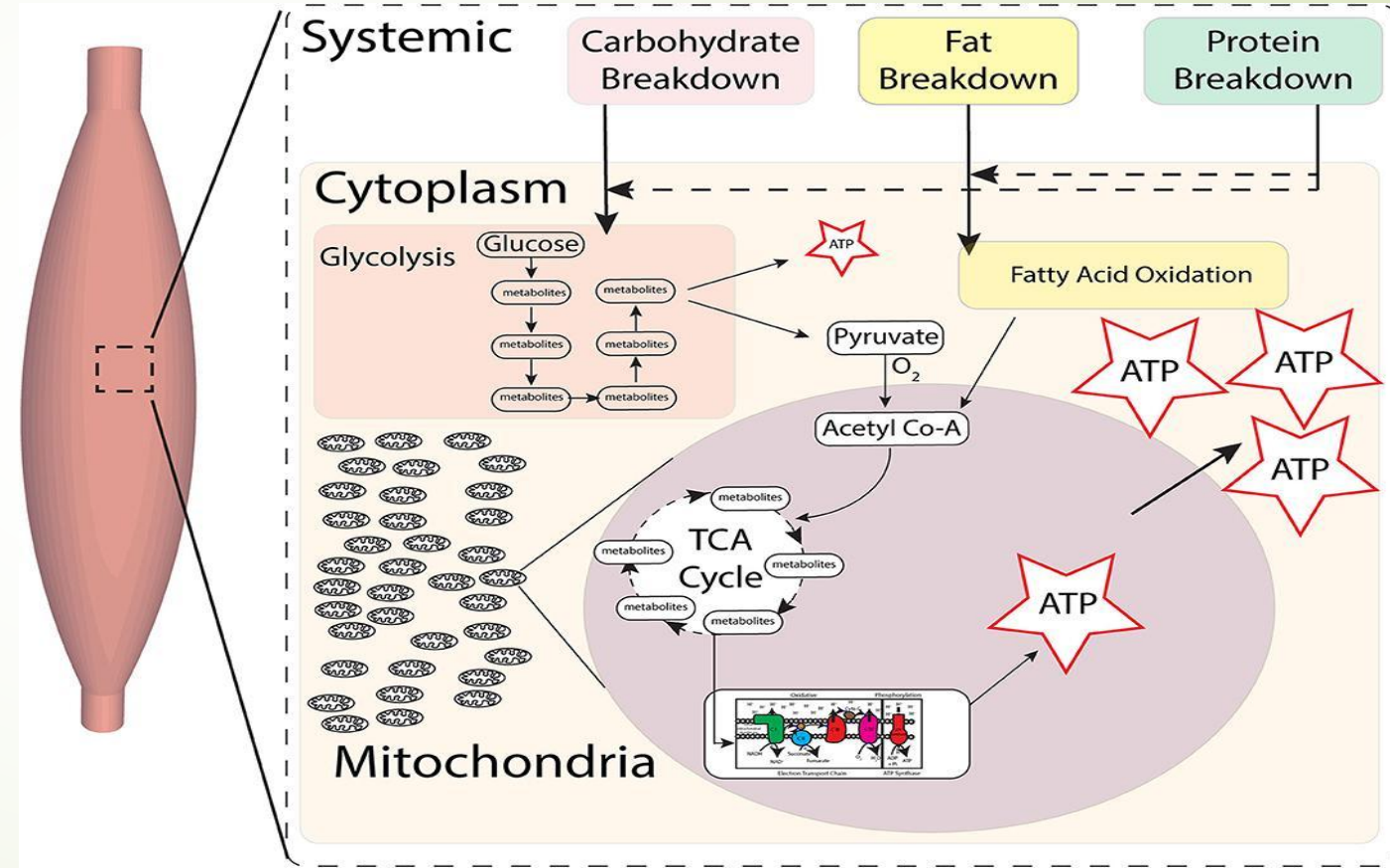
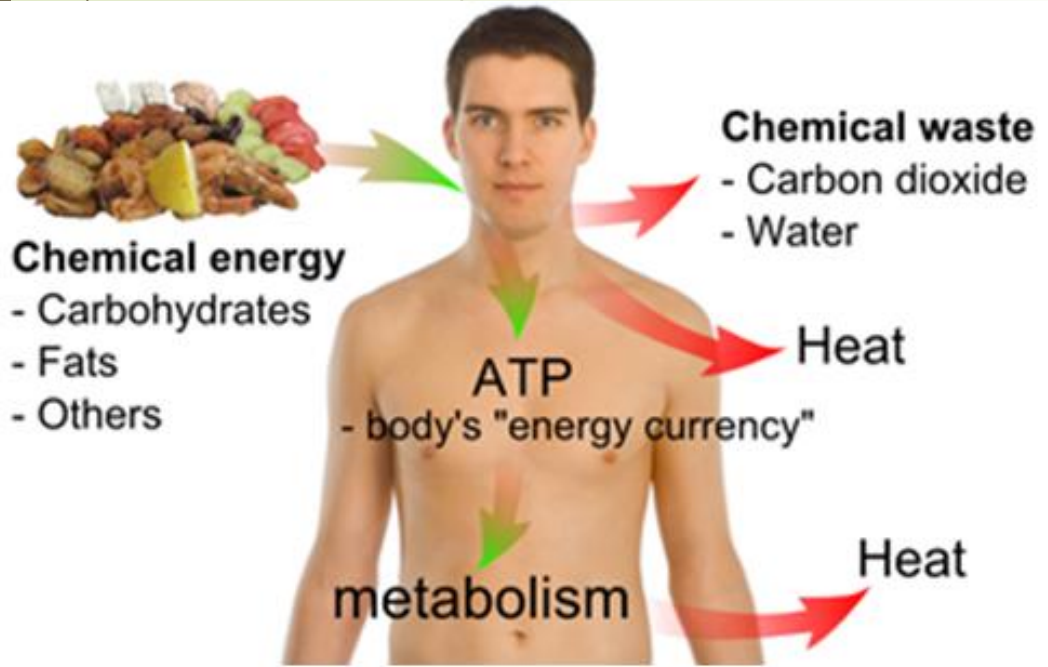


# **Prehrana i hidracija u cilju optimizacije performansi u sportovima izdržljivosti**

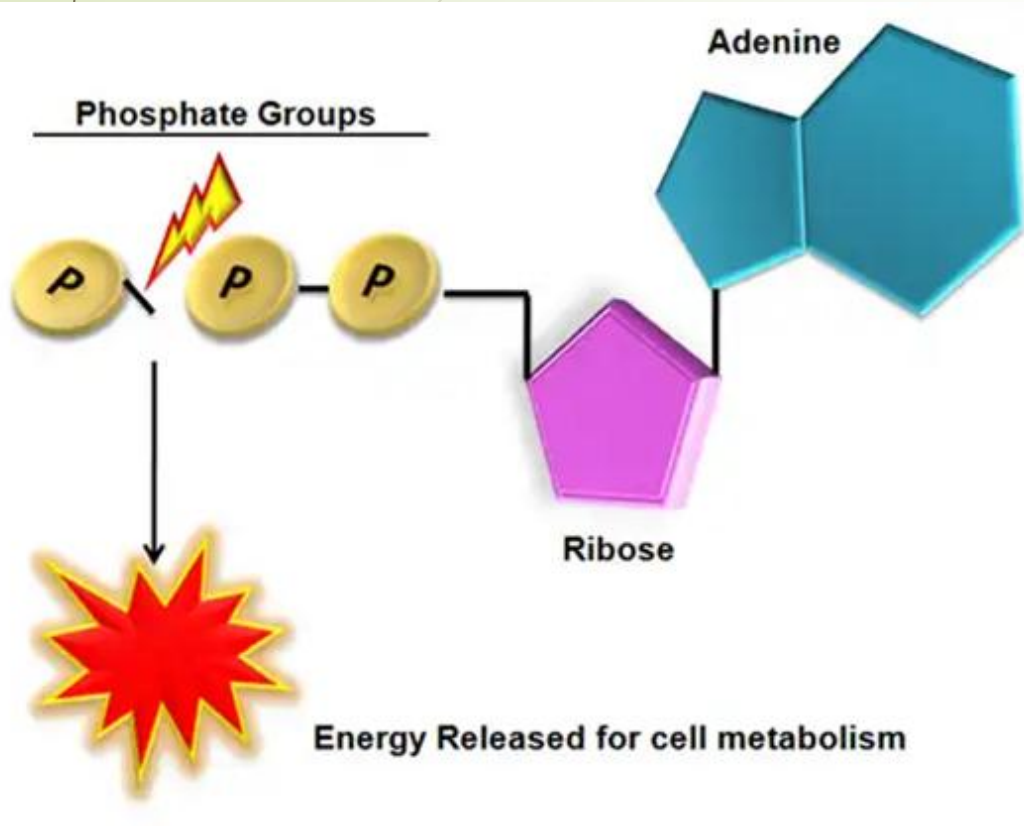
13.11.2025.

**Dr.sc. Sebastijan Orlić**

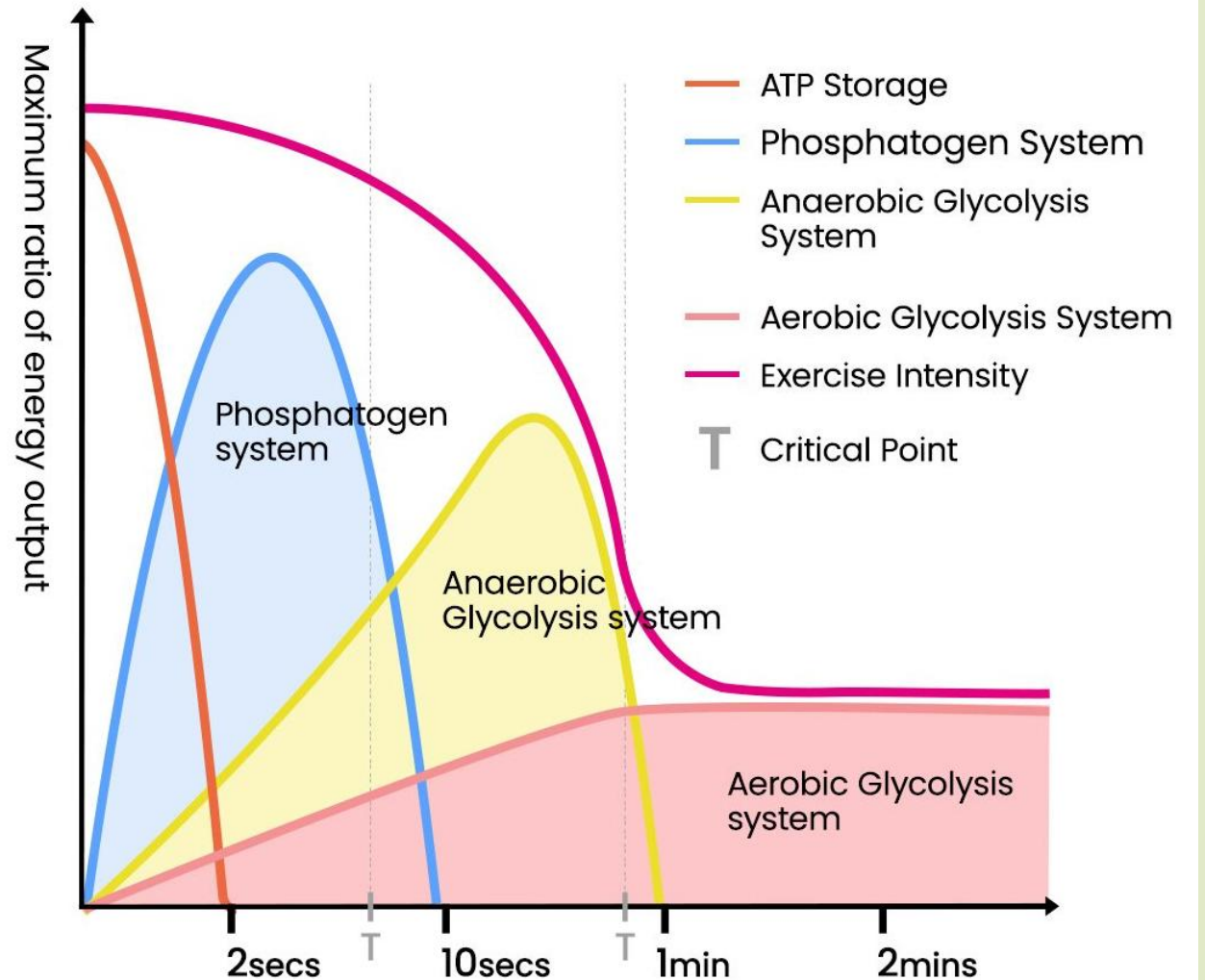
# OSNOVE ZNANOSTI PREHRANE - PROIZVODNJA ENERGIJE U TIJELU ČOVJEKA



# OSNOVE ZNANOSTI PREHRANE - ENERGETSKI SUSTAVI

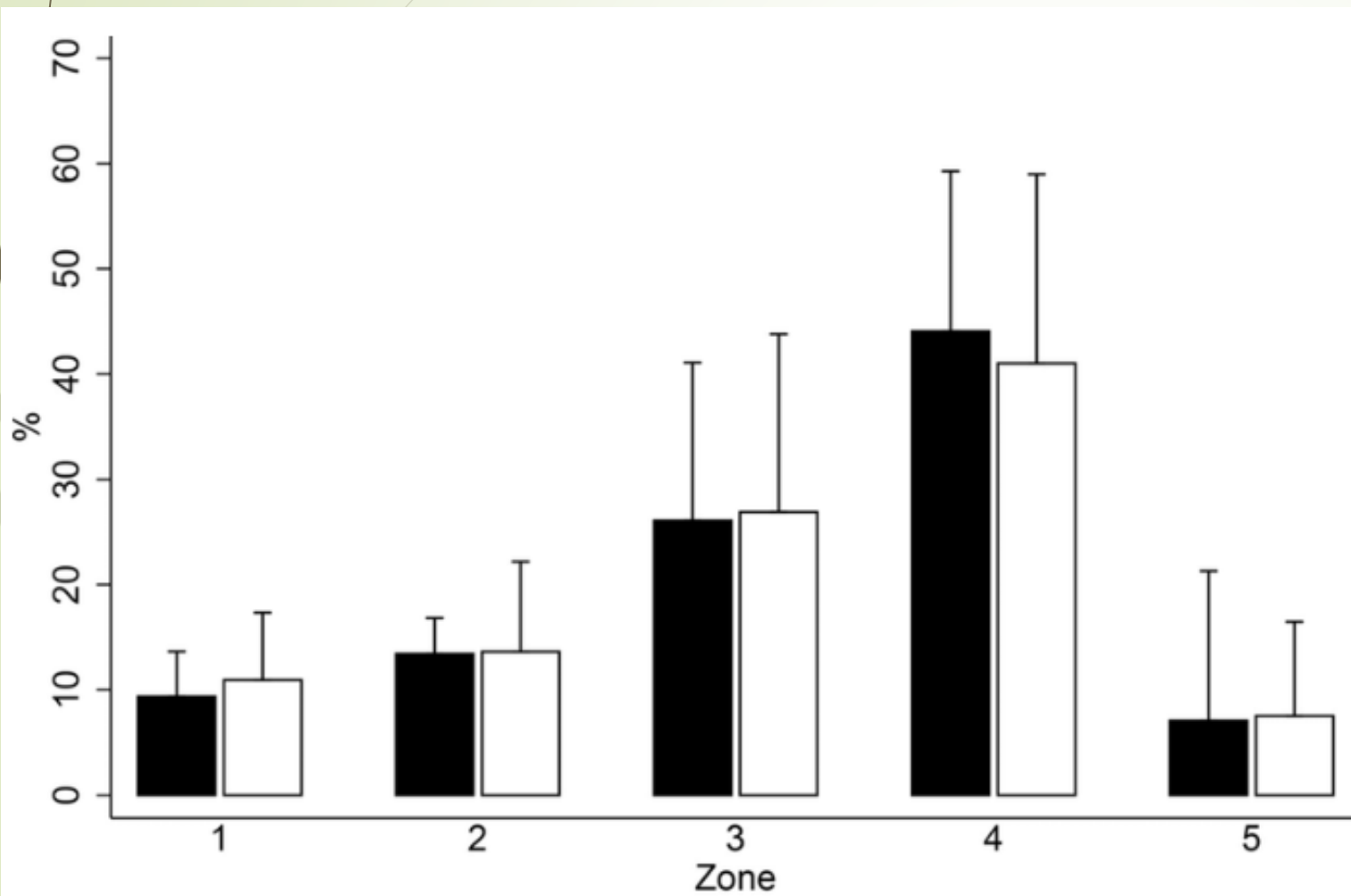


## 3 PRIMARY ENERGY SYSTEMS IN THE BODY



# OSNOVE ZNANOSTI PREHRANE – HR ZONE

Raspodjela intenziteta napora prema zonama srčanog pulsa:



## HEART RATE ZONES

$$207 - (.7 \times \text{AGE}) = \text{MAX HEART RATE}$$

**ZONE** 90-100% max ♥ rate **ALL-OUT EFFORT**

# 5

*Combination of skull and wailing face emojis*

When your Flywheel instructor tells you to push for the last 30 seconds even though you feel like you're actually dying.

**ZONE** 80-90% max ♥ rate **FEELIN' THE BURN**

# 4

*It's getting hot in herrrrrrrrre*

When you're going all out on the dance floor at a wedding and the sweat is dripping, but you know you can push through it because you're killing it.

**ZONE** 70-80% max ♥ rate **CHALLENGING BUT DOABLE**

# 3

*Picking up the pace*

Not texting your ex back—challenging but doable. This is working at an intensity you can sustain for around 30 minutes if you had to.

**ZONE** 60-70% max ♥ rate **MANAGABLE**

# 2

*What, like it's hard?*

You just saw a cute dog and you're trying to catch up to pet it. It's like a warm-up or a cool-down—you should be able to carry on a conversation.

**ZONE** 50-60% max ♥ rate **RECOVERY**

# 1

*By all means, move at a glacial pace*

Your recovery zone. Walking from your couch to the fridge to get snacks, while rewatching *Parks and Rec* for the third time. Basically, very, very light exercise.

# OSNOVE ZNANOSTI PREHRANE - ENERGETSKI SUPSTRATI

Skeletni mišići se sastoje od 2 vrste mišićnih vlakana –

- Tip I, također poznat kao „spora vlakna“,
- i Tip II, ili „brza vlakna“. Brza vlakna (fast twitch) također su podijeljena u dvije podskupine koje se nazivaju tip IIa i IIb.

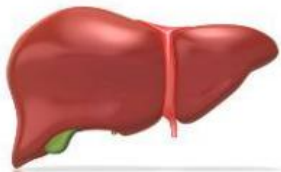
Svaki intenzitet vježbe podrazumijeva različite metaboličke odgovore i obrasce regrutacije mišićnih vlakana što također odgovara različitim zonama srčanog pulsa:

| Training Zone | Energy Substrate Mainly Used | Type of Fiber |
|---------------|------------------------------|---------------|
| Zone 1        | Fat                          | Type I        |
| Zone 2        | Fat-Carbohydrates            | Type I        |
| Zone 3        | Fat-Carbohydrates            | Type I-IIa    |
| Zone 4        | Carbohydrates                | Type IIa      |
| Zone 5        | Carbohydrates                | Type IIa-b    |
| Zone 6        | Carbohydrates-ATP-PC         | Type IIb      |

# OSNOVE PREHRANE - ENERGETSKI SUPSTRATI

## Body energy stores

### Carbohydrate



Liver glycogen  
**80-100g**



3 miles running  
**320-400 kcal**



Muscle glycogen  
**300-500g active**



14 miles running  
**1,200-2,000 kcal**

### Fat



Adipose tissue  
**>5000g**



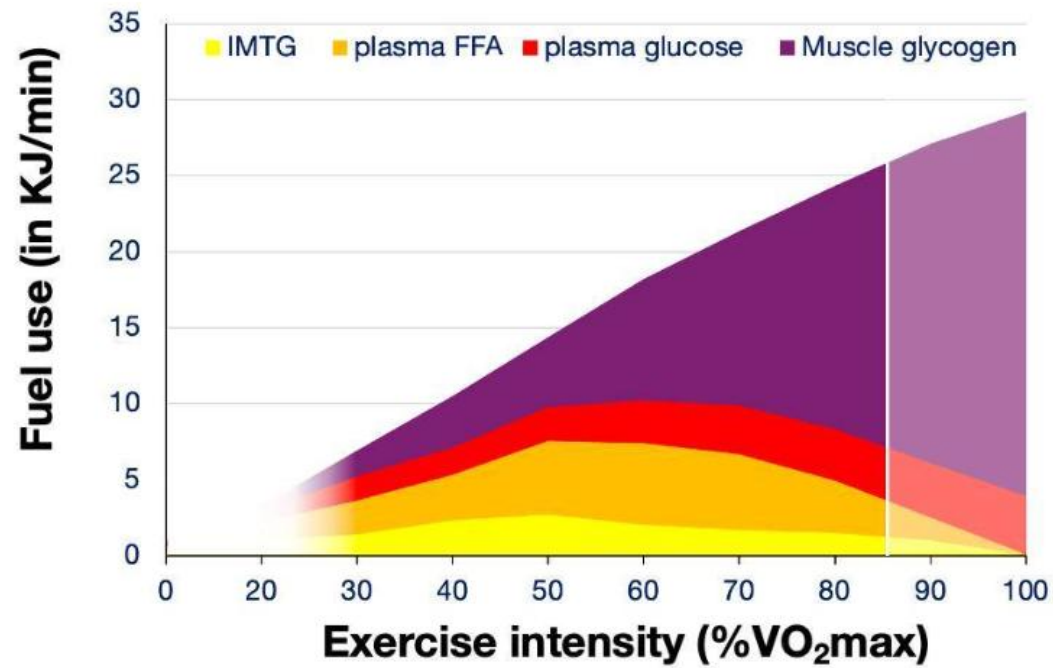
>400 miles running  
**> 45,000 kcal**

Calculations are rough estimates for a 70 kg (154 lbs) person



# ENERGETSKI SUPSTRATI I SPORTSKE PERFORMANSE

## Fuel use during exercise at different intensities



- IMTG is intramuscular fat (fat stored in the muscle)
- Plasma FFA are free fatty acids derived from adipose tissue
- Plasma glucose is glucose coming from glycogen in the liver
- A mix of fuels is used at all intensities

# Od čega se sve sastoji hrana?

Hrana sadrži:

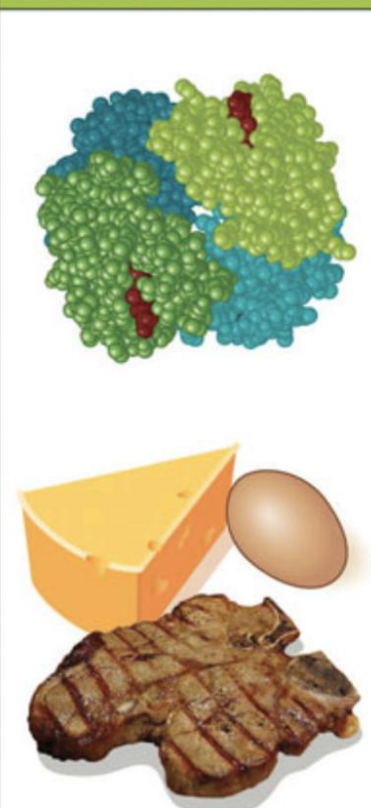
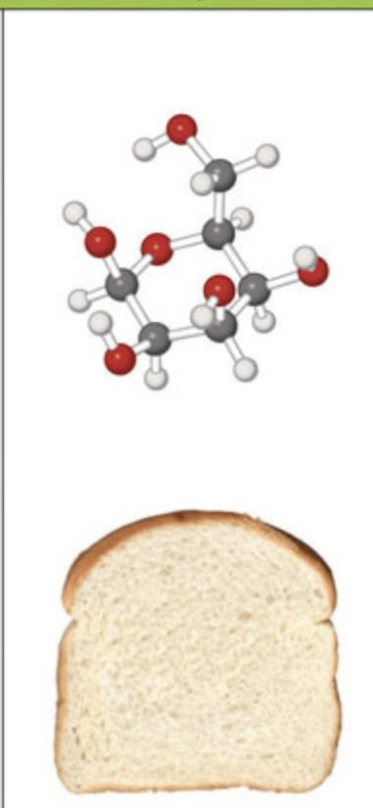
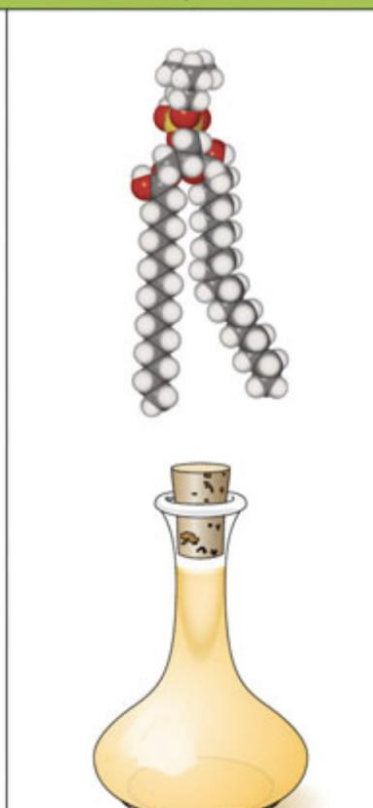
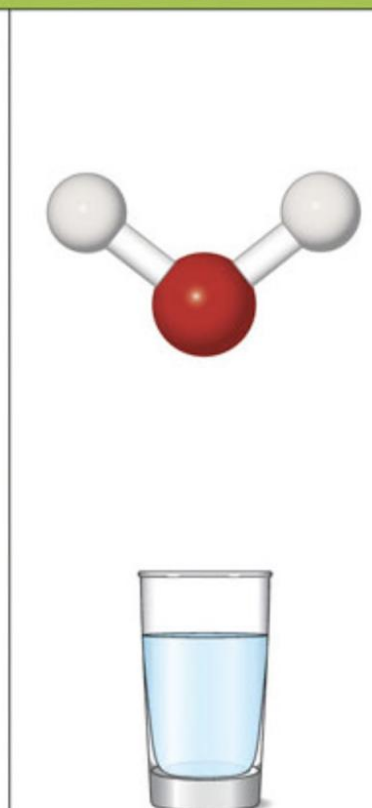
1. **makronutrijente – proteine, ugljikohidrate i masti**

2. mikronutrijente – **minerale** i vitamine

3. fitonutrijente i zoo-nutrijente - komponente koje se nalaze u biljnim/životinjskim izvorima

4. **vodu**

Sadrži i druge tvari, poput vlakana, koje naše tijelo ne koristi direktno, već ih koriste bakterije koje žive u našem probavnom sustavu.

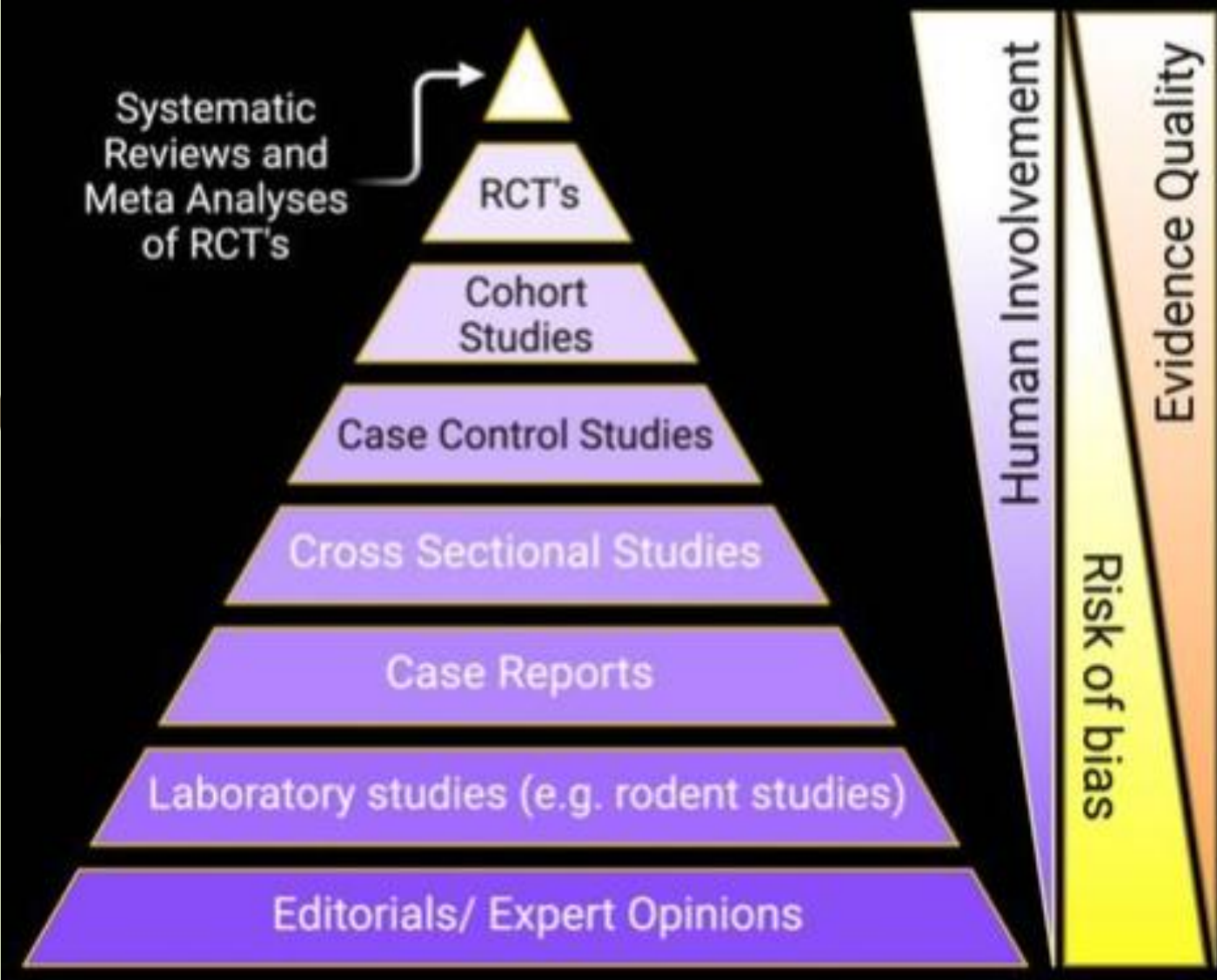
| Proteins  | Carbohydrates  | Lipids  | Water  |
|---|--|---|--|
|  |  |  |  |

## Ključni parametri za optimizaciju prehrambenih protokola

**Factors that will determine the type of nutrition:**



# HIERARCHY OF EVIDENCE



**Nisu svi znanstveni dokazi jednaki.**

Kao znanstvenici koristimo se cijelom piramidom kako bismo procijenili koliko su zaključci smisleni.

Bez obzira na to gdje neka činjenica dobivena istraživanjima postoji na ovoj piramidi, još uvijek se može pogrešno tumačiti tijekom vremena. Čak i podaci dobiveni u istraživanjima na ljudima.

Moramo biti otvoreni za nove ideje i ispitivati nove dokaze, istraživanjima pristupati otvorenog uma i otvarati rasprave pune poštovanja.

**Prilikom ispitivanja hijerarhije dokaza:  
PODACI > OSJEĆAJI (DATA > FEELINGS)**

# PREHRANA NA DAN TRENINGA

## TRAINING DAY NUTRITION

UEFA Expert Group Statement on Nutrition in Elite Football - Collins et al. BJSM 2020



### MACRONUTRIENTS

#### CARBOHYDRATE



**3-8**  
g/day/kg body mass (BM)

Depending on the specific training scenario and individual player training goals

#### PROTEIN

**1.6-2.2**

g/kg BM per day

**0.3-0.4**

g/kg BM per meal

##### MAIN SOURCES

Dairy & many animal-source proteins



Plant-based proteins can also be used, but higher intake is needed for the same effect on muscle protein synthesis

#### FAT

**20-35%**

of total dietary energy



Ketogenic low-CHO, high-fat diets are not suited to the requirements of football

### KEY MICRONUTRIENTS

#### VITAMIN D



At least  
**75**  
nmol/L

Supplement of 2,000 IU vitamin D3 per day is recommended to correct deficiencies (with retesting)

#### IRON

To be tested on a regular basis (ferritin & haemoglobin)

Meet RDA with bioavailable sources (including meat, seafood), with non-haem sources consumed with vitamin C



Limit foods/fluids (e.g. tea & coffee) which impair absorption

#### CALCIUM

**>700**  
mg per day

**MAIN SOURCES**  
Dairy products



**SECONDARY SOURCES**

Green leafy vegetables, nuts & soya beans

# PERFORMANSE – DAN NATJECANJA

## MATCH DAY NUTRITION

UEFA Expert Group Statement on Nutrition in Elite Football - Collins et al. BJSM 2020



**1** On the day prior to a match (MD-1), MD and MD+1 carbohydrate (CHO) intake should be increased to elevate muscle glycogen stores

**6-8**

g/day/kg body mass (BM)



**2** Intake is often lower than this and a conscious effort should be made to increase CHO intake at the cost of fat intake (and possibly protein intake)

**↑ CHO**

**↓ FAT ↓ PRO**



**3** 3-4 h before a match a meal should be ingested that is high in CHO (1-3 g/kg BM) to replenish liver glycogen stores



**4** Start the match fully hydrated by consuming 5-7 ml/kg BM fluid 2-4 hours prior to kick-off. Drink sufficient fluids to prevent significant dehydration by developing an individualised plan based on sweat losses



# VAŽNOST (RE)HIDRACIJE

Voda je najzastupljenija komponenta ljudskog tijela, budući da čini između 40 i 70% ukupne tjelesne mase (varijacije ovise o spolu, dobi i građi tijela svakog subjekta).

I intenzivna tjelesna aktivnost i toplinski stres povećavaju dnevne potrebe za tekućinom za oko 4 do 5 puta.

Prema American College of Sports Medicine, unos tekućine ilustrira potrebu davanja preporuka o unosu prema stopi znojenja, a ne prema smjernicama WHO-a.

## Fluid Intake

### Proposed variability

|         | European Food Safety Authority 2010 | National Health and Medical Research Council, 2006 | Institute of Medicine, 2004 | World Health Organization, 2003 |
|---------|-------------------------------------|--|-----------------------------|---------------------------------|
| Males   | 2,5                                 | 3,4  | 3,7                         | Sedentary 2,9<br>Active 4,5     |
| Females | 2,0                                 | 2,8  | 2,7                         | Sedentary 2,2<br>Active 4,5     |

## Key Factors

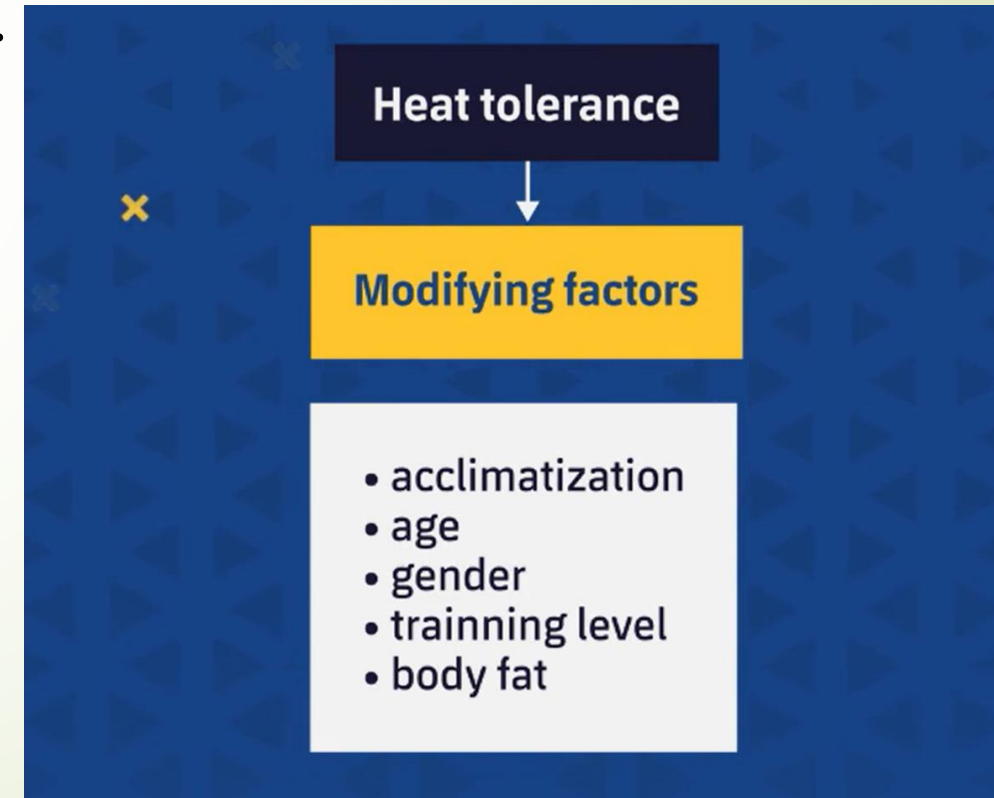
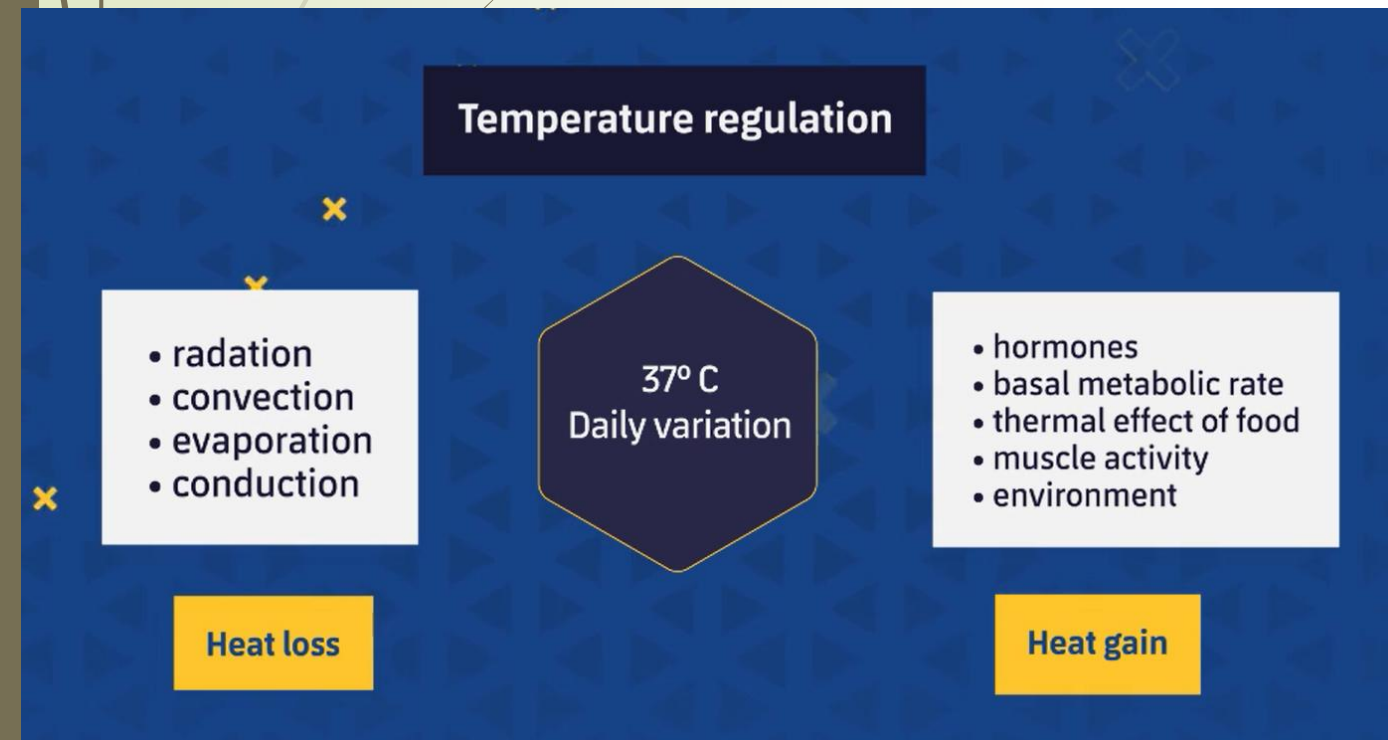
Physical activity, ambient temperature and relative humidity, are the three factors that determine the broad variability in the amount of water the subject needs to compensate water lost through sweat.

# REGULACIJSKI I NERAVNOTEŽNI FAKTORI

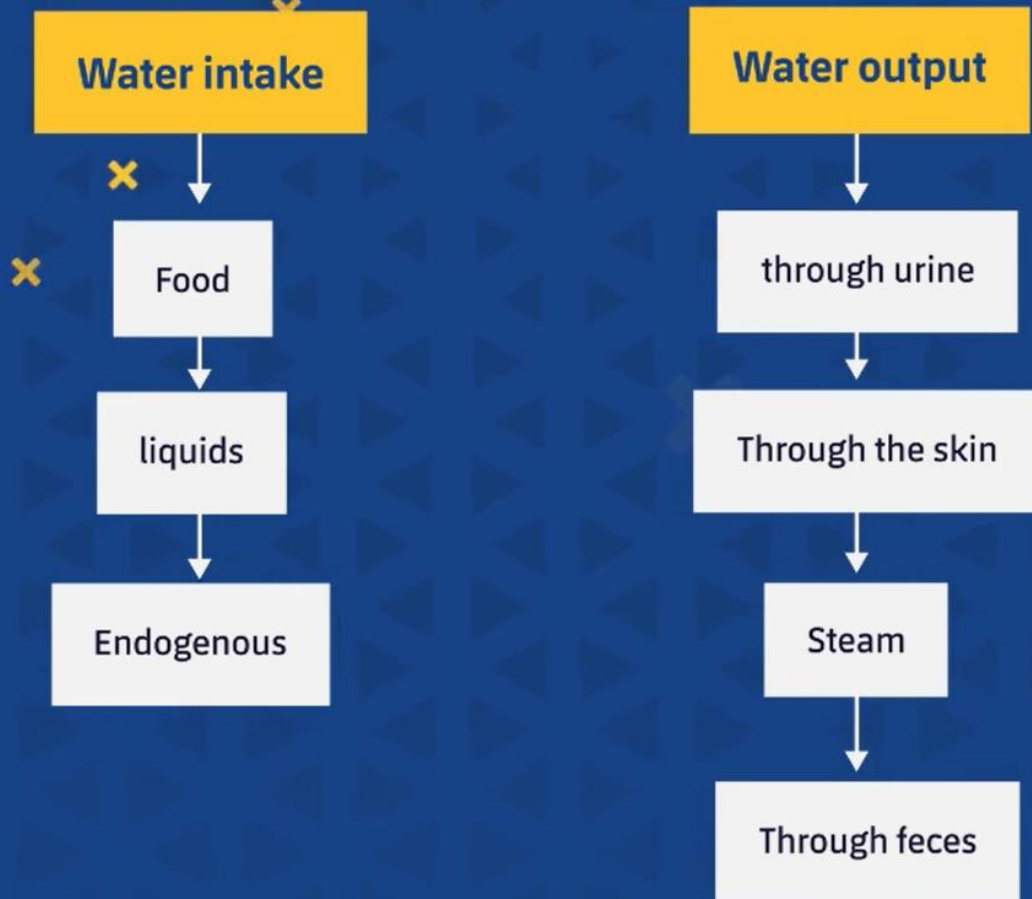
Sva tijela zrače toplinu putem elektromagnetskih valova, a sunce je glavni izvor toplinskog zračenja.

Kada smo izloženi ekstremnoj hladnoći, možemo se suočiti s prekomjernim gubitkom topline, zbog čega se proizvodnja tjelesne topline povećava kroz različite prilagodbe, kao što su: vaskularne, hormonalne i mišićne prilagodbe.

Toplina stvara najveću količinu neravnoteže tijekom vježbanja, a čimbenici koji nose najveći teret su: **aklimatizacija, dob, spol, razina utreniranosti i tjelesna masnoća.**



## Fluid balance



Od iznimne je važnosti očuvati ravnotežu tekućine.

Zanimljivost: Voda u hrani čini oko 20-30% ukupnog preporučenog unosa tekućine.

U normalnim uvjetima, bubrezi apsorbiraju gotovo 99% od 140 do 160 litara bubrežne filtracije koja se nakuplja svaki dan.

Zbog toga, volumen urina koji izlučuju bubrezi varira **između 1.000 i 1.500 mililitara dnevno**, što je najveći izvor gubitka tekućine u ljudskom tijelu.

# RIZICI DEHIDRACIJE

## Effects of dehydration



### Main effects

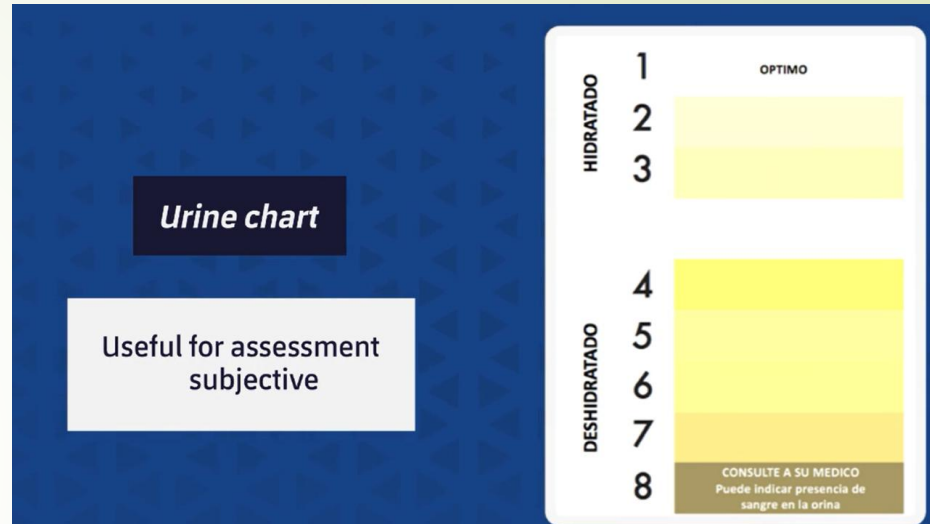
- reduces the rate of gastric emptying
- gastrointestinal distress and gastric intolerance
- increases internal temperature
- increases heart rate
- increases the use of muscle glycogen
- with 2% loss, exercise capacity is affected

Stanje dehidracije veće od 2% tjelesne težine smanjuje izvedbu (osobito u aerobnim vježbama).

Jedan od fizioloških čimbenika koji se javlja rano i koji pridonosi smanjenju performansi je povećanje unutarnje tjelesne temperature pojedinca.

# MARKERI HIDRACIJE

| Markers of hydration state    |               |                   |                       |
|-------------------------------|---------------|-------------------|-----------------------|
| Measurement                   | Practical use | Validity          | Euhydration cut-point |
| Total body water              | Low           | Acute and chronic | < 2 %                 |
| Plasma osmolality             | Medium        | Acute and chronic | < 290 mOsmol          |
| Specific gravity of the urine | High          | Chronic           | < 1020 Usg            |
| Urine osmolality              | High          | Chronic           | < 700 mOsmol          |
| Body weight                   | High          | Acute and chronic | < 1 %                 |



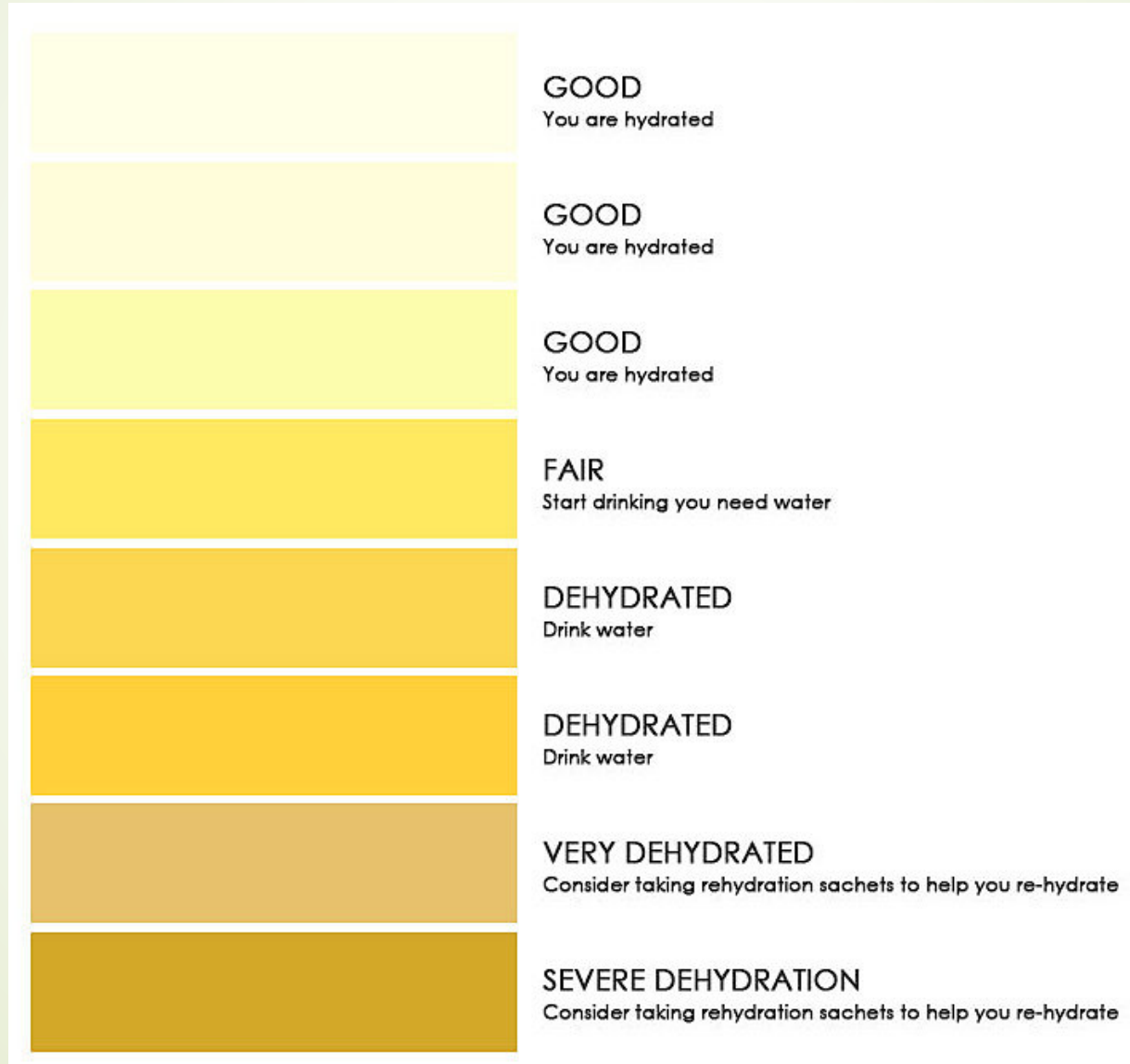
Ukupna količina vode u tijelu predstavlja jedno od najpouzdanijih mjerenja za određivanje stanja hidratacije tijela, ali zbog svoje praktičnosti nije korisno za većinu ljudi.

**Gubici veći od 7% tjelesne težine, s mučninom, povraćanjem ili proljevom,** ili ljudi koji iz bilo kojeg razloga ne mogu unositi tekućinu oralno, mogu opravdati intravensku nadoknadu tekućine.

**Urine chart** je edukativni alat za pojedinca koji omogućuje određivanje statusa hidracije subjekta samo na subjektivan način.

# VODA I BALANS FLUIDA

Za većinu ljudi je ipak dovoljna analiza boje mokraće:



# SPORTSKI NAPITCI

## TYPES OF SPORTS DRINKS



**HYPOTONIC**  
fastest hydration,  
low in carbs



**ISOTONIC**  
hydration and fuel,  
medium in carbs



**HYPERTONIC**  
recovery, high  
in carbs

# SPORTSKI NAPITCI

## Sports drink

### Optimum formula

- 50 a 80 g de CHO/lit
- 80 a 350 Kcal/lit
- More than one CHO in the mixture
- Osmolarity of between 200 and 400 mOsm/L
- Between 20 and 60 mmol/L. of sodium (460 to 1380 mg/L)

Optimalni sportski napitak trebao bi isporučiti približno 50 do 80 g CHO/L, što je ekvivalent koncentraciji od 5-8%.

**Više od jednog ugljikohidrata u napitku, brzi šećeri: npr. maltodekstrin + fruktoza!**

Za tradicionalnu pripremu domaćih sportskih napitaka potrebna je voda (flaširana ili pitka voda iz slavine), sok od naranče/grejpa, šećer (idealno složen i različit) i kuhinjska sol.

## Homemade sports drink

Water

1000 ml

Salt

1 gr

Sugar

50 gr




Lemon

150 gr

**Vitamini ili BCAA koje oni mogu sadržavati nisu bitni za dizajn i efikasnost sportskih napitaka, samo za marketing i cijenu proizvoda.**

# STRATEGIJE HIDRATACIJE ZA PERFORMANSE I OPORAVAK

www.mysportscience.com

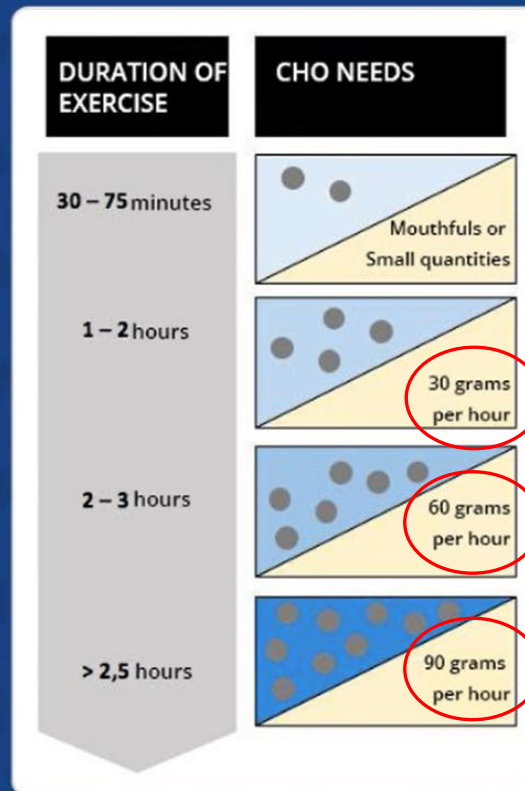
|  Slow carbohydrates  |  Rapid carbohydrates                                     |  Very rapid carbohydrates (blends)   |
|---|---|---|
| Up to 0.6 g/min   | Up to 1.0 g/min   | Up to 1.75 g/min  |
| <ul style="list-style-type: none"><li>• Fructose</li><li>• Galactose</li><li>• Isomaltulose</li><li>• Trehalose</li><li>• Amylose</li></ul> | <ul style="list-style-type: none"><li>• Glucose</li><li>• Sucrose</li><li>• Maltose</li><li>• Maltodextrins</li><li>• Amylopectin</li></ul> | <ul style="list-style-type: none"><li>• Glucose and fructose<br/>(at least 60g/h glucose)</li><li>• Maltodextrin and fructose<br/>(at least 60g/h maltodextrin)</li><li>• Glucose, sucrose and fructose<br/>(at least 60g/h glucose and sucrose).</li></ul> |

**During exercise:** Faster carbohydrates generally cause less gastro-intestinal problems and deliver more benefits than slow carbs.

# SPORTSKI NAPITCI

## The role of sports drinks

The importance of ingesting carbohydrates (CHO) while exercising as a tool to delay the onset of fatigue in athletes.



Brojne studije su pokazale da potreba za CHO raste u odnosu na trajanje vježbanja; međutim, od 45 minuta nakon početka, treba konzumirati male količine CHO.

Potrebe se šire kako se povećava trajanje aktivnosti!

**TRIATLON I OSTALI 3+h ZADATCI  
DUGIH DISTANCI: 90g UGH/sat!!!**

**+GELOVI, SUHO VOĆE, KEKSI...**

Većina sportskih napitaka na tržištu obično sadrži CHO, natrij i kalij.

# STRATEGIJE ZA NADOKNADU FLUIDA

## Fluid replenishment

```
graph TD; A[Fluid replenishment] --> B[Pre-exercise]; A --> C[During exercise]; A --> D[Post-exercise]; B --> E[• Slowly drink 5 to 7 ml/kg during the 4 hours before exercising<br>• In hot humid environments, consume 500 ml in the preceding hour.<br>• Salty foods help stimulate thirst and fluid retention.]; C --> F[• Compensate for lost liquids after 30 minutes<br>• Drink 6 to 8 ml of liquid per kg of weight and hour of exercise<br>• The ideal temperature of liquids is between 15-21 degrees Celsius]; D --> G[• Rehydration should begin immediately<br>• It is recommended to drink at least 150% of the weight lost within the first 6 hours after exercising];
```

### Pre-exercise

- Slowly drink 5 to 7 ml/kg during the 4 hours before exercising
- In hot humid environments, consume 500 ml in the preceding hour.
- Salty foods help stimulate thirst and fluid retention.

### During exercise

- Compensate for lost liquids after 30 minutes
- Drink 6 to 8 ml of liquid per kg of weight and hour of exercise
- The ideal temperature of liquids is between 15-21 degrees Celsius

### Post-exercise

- Rehydration should begin immediately
- It is recommended to drink at least 150% of the weight lost within the first 6 hours after exercising

Rizici suplementacije! Uvijek provjerite kod ovlaštenih tijela i prisutnost certifikata:



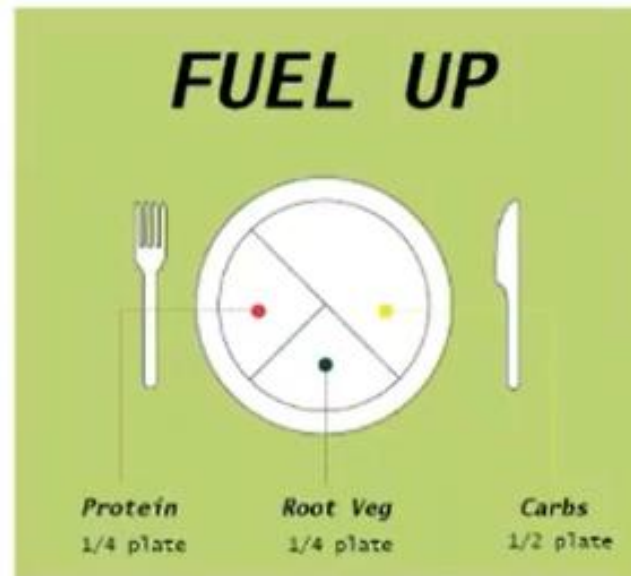
Certified for Sport®



Nederlands Zekerheidssysteem  
Voedingssupplementen Topsport



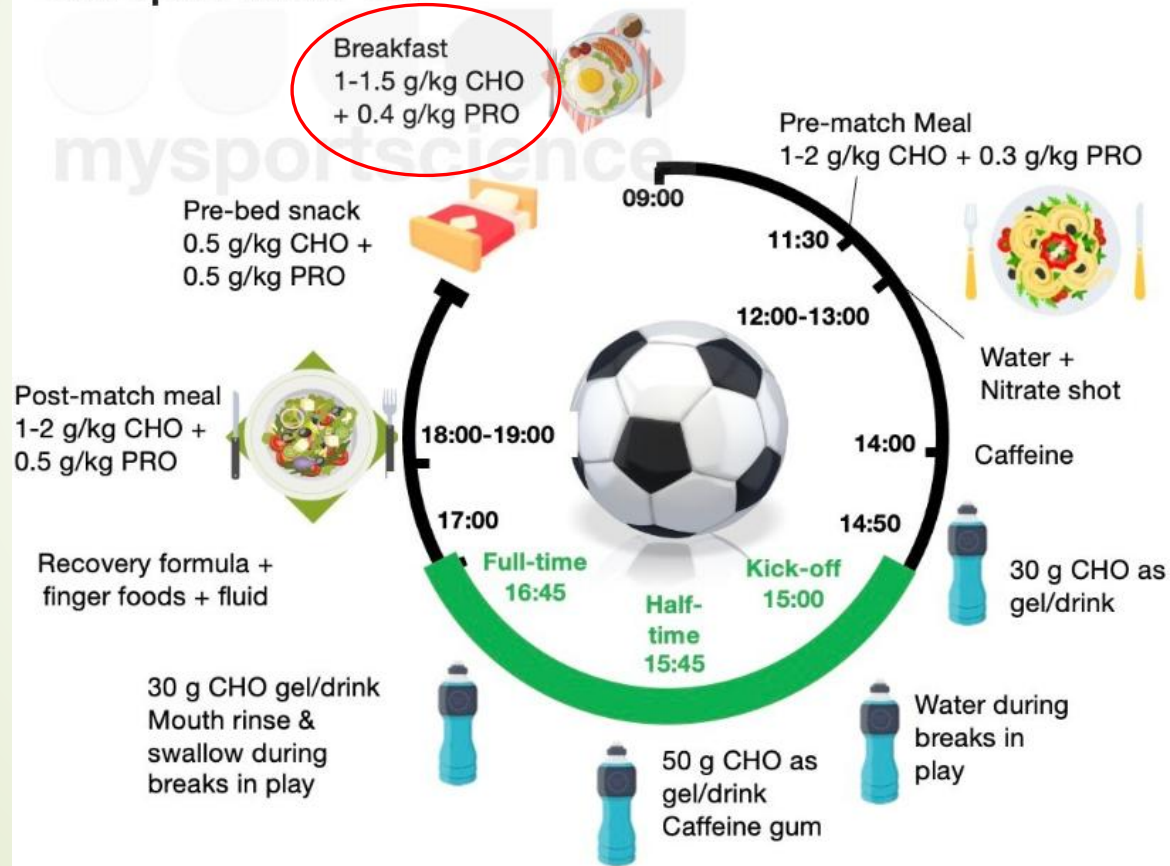
# PERFORMANSE – DAN NATJECANJA



# TIMING OBROKA

## Match-day nutrition

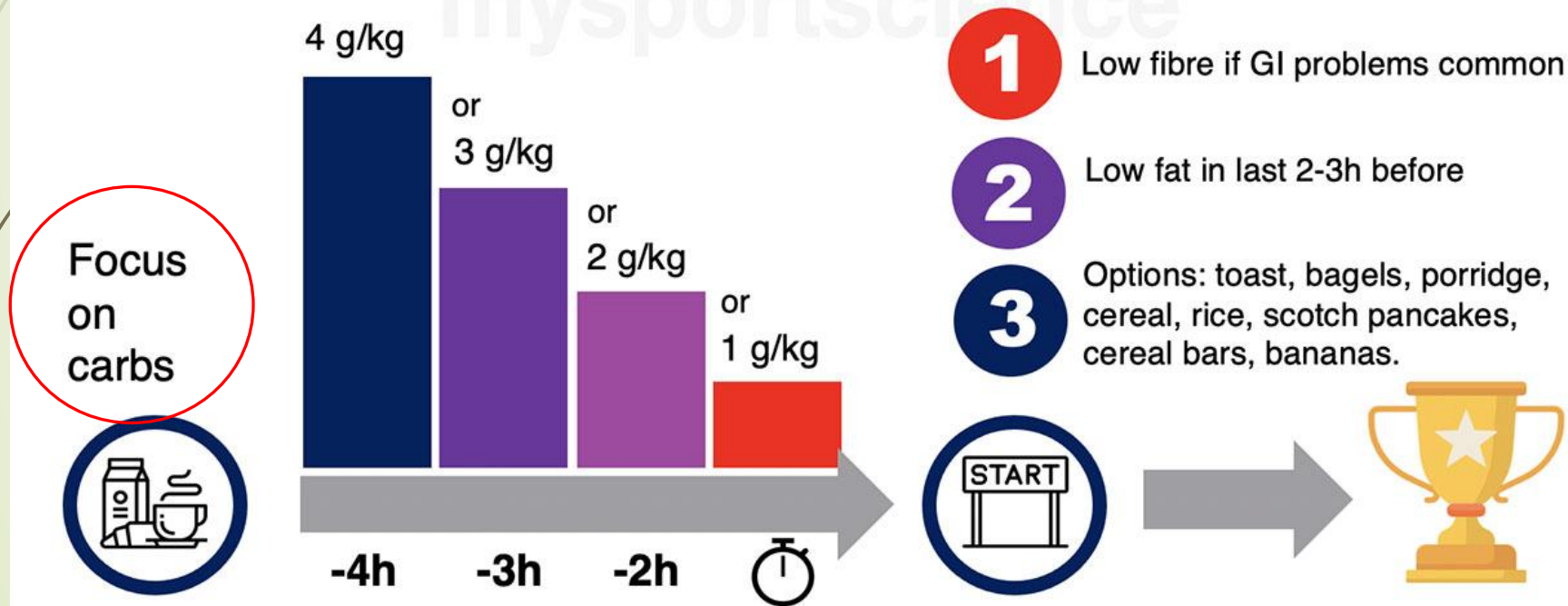
3:00pm kick-off



# DORUČAK NA DAN UTAKMICE

## Breakfast before competition

Size meal depends on time to digest



# DORUČAK NA DAN UTAKMICE

Nekoliko praktičnih primjera koje možete kombinirati kako bi odgovarali vašim željama kako biste napravili savršen doručak prije utakmice:

- **Tost ili peciva s dodacima** npr. džem, maslac od kikirikija (manje količine), Nutella (manje količine). Odaberite bijeli kruh ako imate problema s probavom hrane bogate vlaknima
- **Zobena kaša** s dodacima npr. maslac od kikirikija (manje količine), džem, voćni kompot, voće, med
- **Smoothie** na bazi voća sa zobi i mjericom proteina
- **Zdjelica žitarica** – opcije s manje vlakana uključuju cornflakes, Cheerios...
- **Voćna salata**
- **Rižini krekeri s nadjevom** ili zdjelica riže s medom
- **Banana bread ili palačinke** – možete dodati nadjeve npr. med, jogurt, cimet, voće

# DORUČAK NA DAN NATJECANJA – UOBIČAJENE GREŠKE

## 1. PRESKAKANJE DORUČKA!!

2. Određena hrana može povećati vjerojatnost nelagode u želucu tijekom natjecanja, posebice **vlakna**. To je zato što je vlaknima potrebno više vremena za probavu, što može značiti da se još uvijek mogu nalaziti u vašem želucu kada utakmica počne. Ako se dobro nosite s probavljanjem ovih namirnica, onda ih svakako ne trebate izbjegavati.
3. Konzumacija previše **masti** prije utakmice također može uzrokovati probleme s probavom jer usporava brzinu pražnjenja hrane iz želuca. Namirnice za doručak s visokim udjelom masti koje možete izbjegavati uključuju slaninu, kobasice, sir i peciva s masnim priložima. Naravno, što je duže vrijeme između doručka i početka utakmice, to postaje manje važno. S druge strane, ako se doručak konzumira neposredno prije natjecanja, to postaje vrlo važan faktor.

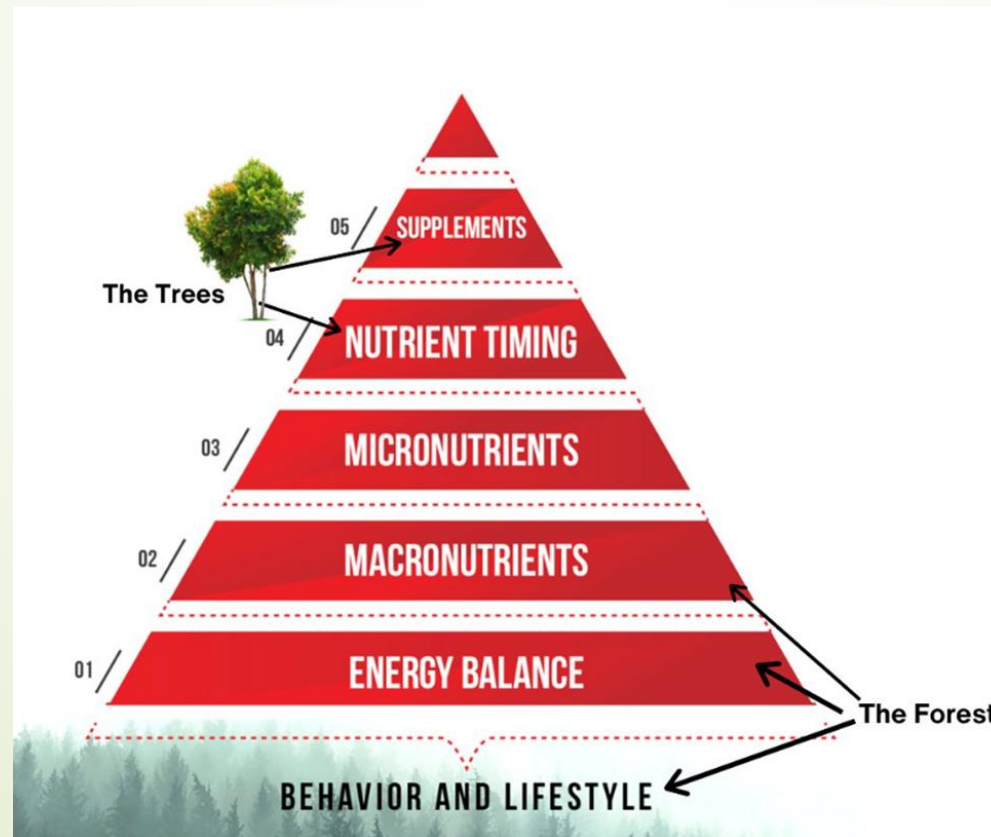
# DORUČAK NA DAN NATJECANJA – UOBIČAJENE GREŠKE

4. Za neke je sportaše korištenje proizvoda koji sadrže **laktozu** također povezano s većim rizikom od želučanih problema. Iako unos hrane često pridonosi gastrointestinalnim problemima, važno je napomenuti da to nije uvijek uzrok. **Hormoni stresa, anksioznost, intenzitet/trajanje vježbanja i hidratacija** također mogu igrati ulogu.

5. Važno je prakticirati doručak na dan natjecanja u smislu sadržaja i vremena tako da na dan utrke ne isprobavate ništa novo ili nepoznato. Počnite **vježbati prehrambene odabire** tijekom **ključnih treninga sličnog intenziteta i dužine trajanja poput utakmice**. To će vam dati vremena da usavršite svoj doručak kako biste **imali povjerenja u njega na dan važnih utakmica!**

# INDIVIDUALNOST I RAZLIKE U PRISTUPU

|                  | Of healthy weight |             | Overweight | Pregnant | Lactating |
|------------------|-------------------|-------------|------------|----------|-----------|
| <b>Sedentary</b> | 1.2–1.8           |             | 1.2–1.5    | ≥1.8     | ≥1.5      |
| <b>Active</b>    | 1.4–2.0           | 1.6–2.4     |            | unknown  |           |
| <b>Goal</b>      | Maintenance       | Muscle gain | Fat loss   |          |           |



# INDIVIDUALNOST I RAZLIKE U PRISTUPU

## General **Body Fat** Percentage Categories

| <u>Classification</u> | <u>Women</u> | <u>Men</u> |
|-----------------------|--------------|------------|
| Essential Fat         | 10-12%       | 2-4%       |
| Athletes              | 14-20%       | 6-13%      |
| Fitness               | 21-24%       | 14-17%     |
| Acceptable            | 25-31%       | 18-25%     |
| At Risk               | >32%         | >25%       |

# INDIVIDUALNOST I RAZLIKE U PRISTUPU

Review > Int J Environ Res Public Health. 2021 Feb 9;18(4):1667. doi: 10.3390/ijerph18041667.

## The Impact of Menstrual Cycle Phase on Athletes' Performance: A Narrative Review

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Affiliations + expand

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### Abstract

The effect of the menstrual cycle on physical performance is being increasingly recognised as a key consideration for women's sport and a critical field for further research. This narrative review explores the findings of studies investigating the effects of menstrual cycle phase on perceived and objectively measured performance in an athletic population. Studies examining perceived performance consistently report that female athletes identify their performance to be relatively worse during the early follicular and late luteal phases. Studies examining objective performance (using anaerobic, aerobic or strength-related tests) do not report clear, consistent effects of the impact of menstrual cycle phase on physical performance. Overall sport performance can be influenced by both perceived and physical factors. Hence, to optimise performance and management of eumenorrhic female athletes, there is a need for further research to quantify the impact of menstrual cycle phase on perceived and physical performance outcomes and to identify factors affecting variability in objective performance outcomes between studies.

**Keywords:** female; menstruation; sport.

Značajan udio sportašica vjeruje da na njihovu izvedbu utječe faza MC-a, ali istraživanje koje se odnosi na objektivne mjere izvedbe tijekom MC-a kod sportašica s eumenorejom ne daje konačne naznake o tome kako izvedba može fluktuirati tijekom MC-a.

Mnoga su istraživanja zaključila da se učinak ne razlikuje između faza MC-a. U studijama koje su promatrale učinak MC-a na izvedbu, bilo je nedosljednosti u nalazima, ali se najčešće navodilo da su snaga i aerobna izvedba oslabljene tijekom kasne lutealne faze, a anaerobna izvedba najčešće je smanjena u kasnoj folikularnoj fazi.

Istraživanje koje otkriva da MC ima posredničku ulogu u tjelesnoj izvedbi pokazuje da faze MC-a različito utječu na snagu, aerobnu i anaerobnu izvedbu.

## INDIVIDUALNOST I RAZLIKE U PRISTUPU

Prehrana u lutealnoj fazi - povećanje **unosa proteina i složenih ugljikohidrata** može pomoći u održavanju mišićne mase i snage, a konzumiranje hrane bogate kalijem i smanjenje unosa soli mogu pomoći u smanjenju nadutosti.

Adekvatna **hidratacija i kvalitetno spavanje** i odmor ključni su za održavanje energije i izdržljivosti u lutealnoj fazi.

Zbog povećane osjetljivosti na upalu, u ovoj fazi treba se **izbjegavati alkohol, jednostavne šećere i kofein**, a **magnezij i omega-3** mogu biti posebno potrebni kao standardna suplementacija.

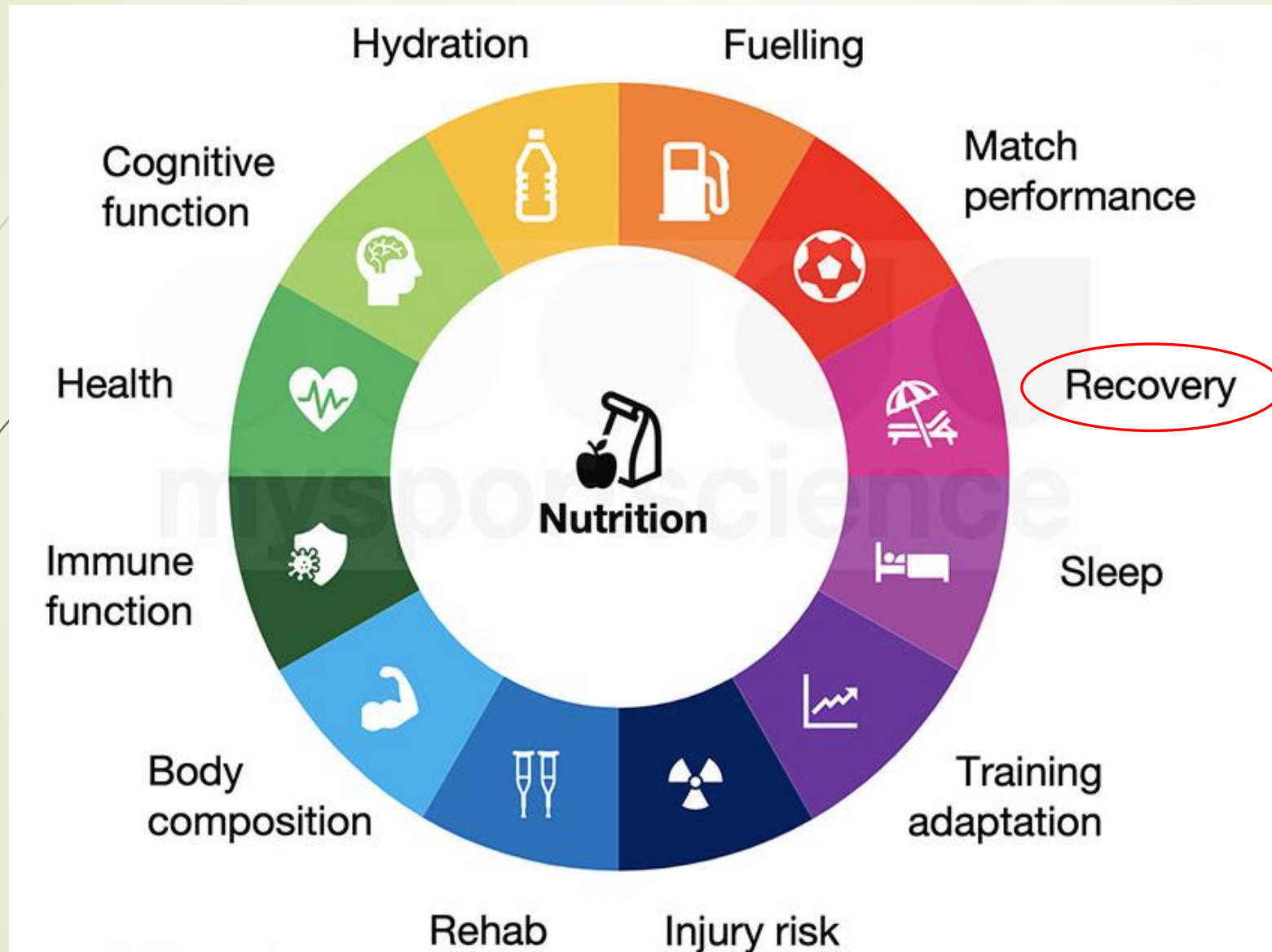
# GRČEVI I PREHRANA

Grčevi mišića su iznenadne nevoljne kontrakcije jednog ili više mišića koje uključuju oštru bol u zahvaćenom području. Grčevi u mišićima češći su tijekom tjelesnog napora i po vrućem vremenu, no mogu biti uzrokovani i određenim lijekovima, dehidracijom i neravnotežom elektrolita. Ipak, **najvjerojatnije su posljedica umora mišića i/ili disfunkcije živaca.**

Ako pojedinac ustanovi da su se njegovi mišićni grčevi ublažili **hidratacijom i elektrolitima, korekcija prehrane je snažan način izbjegavanja pojavnosti ovih simptoma.** Na primjer, konzumacija voća bogatog vodom i šećerima za hidrataciju, soli za natrij (oprez za one s hipertenzijom), mliječnih proizvoda za kalcij i **različitog povrća za ostale mikronutrijente, polifenole i antioksidanse.**

Inače, **fokus na odmor i san** važan je za ublažavanje mišićnog grča povezanog s vježbanjem (EAMC). Što se tiče prehrane, to znači **fokusiranje na unos odgovarajućih dnevnih količina ugljikohidrata, proteina i masti za razinu aktivnosti pojedinca.**

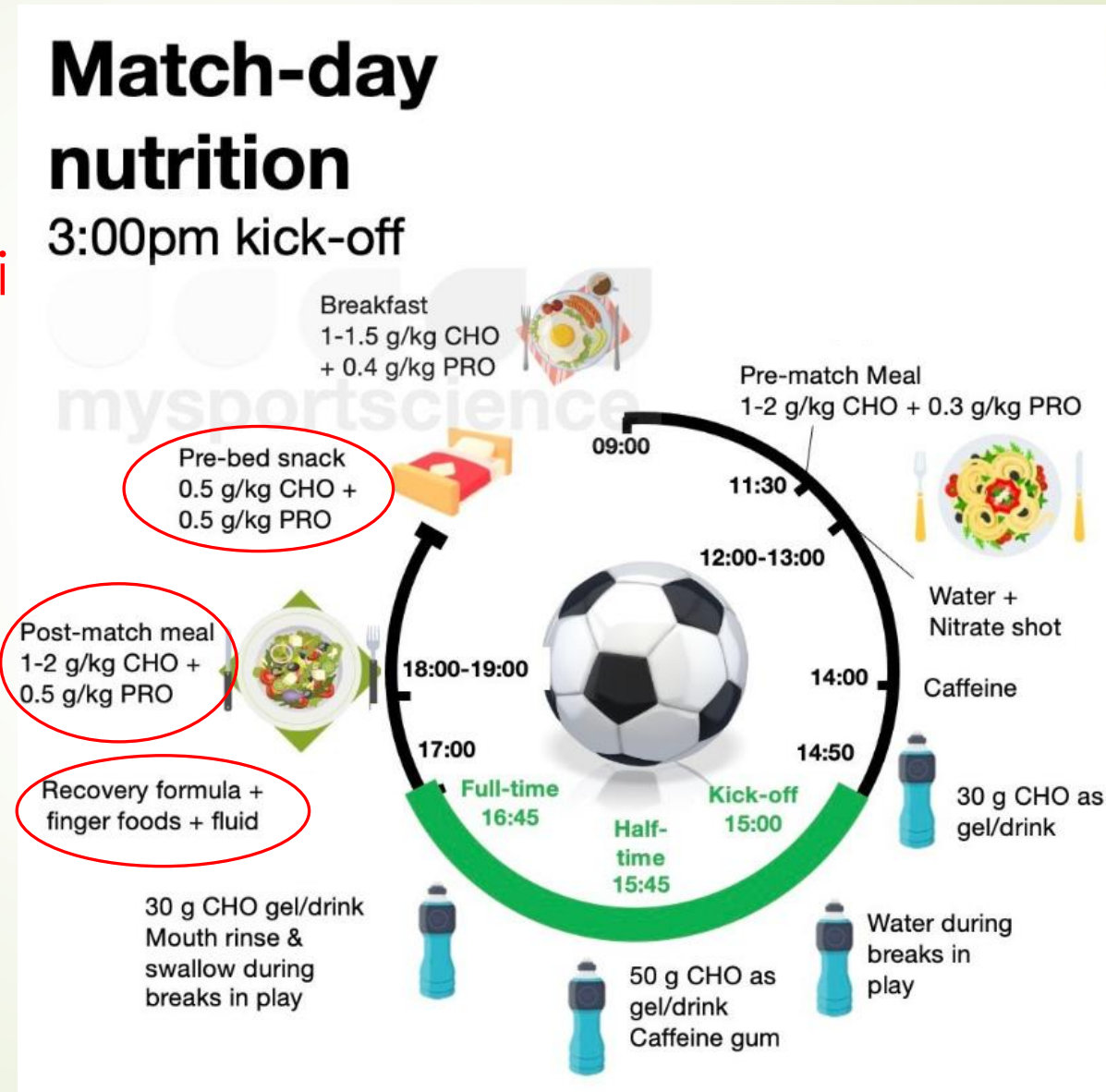
# Važnost prehrane za oporavak!



# OPORAVAK NAKON NATJECANJA – INDIVIDUALIZACIJA I TIMSKI SPORTOVI

Mix ugljikohidrata i proteina, elektroliti i izotonicni

Opcije za bolji san nakon kasnije aktivnosti: glicin, tart cherry juice... (iduće predavanje)



# OPTIMALNI SPORTSKI NAPITAK NAKON AKTIVNOSTI – INDIVIDUALIZACIJA

## Fluid replenishment

```
graph TD; A[Fluid replenishment] --> B[Pre-exercise]; A --> C[During exercise]; A --> D[Post-exercise]; B --> B1[• Slowly drink 5 to 7 ml/kg during the 4 hours before exercising]; B --> B2[• In hot humid environments, consume 500 ml in the preceding hour.]; B --> B3[• Salty foods help stimulate thirst and fluid retention.]; C --> C1[• Compensate for lost liquids after 30 minutes]; C --> C2[• Drink 6 to 8 ml of liquid per kg of weight and hour of exercise]; C --> C3[• The ideal temperature of liquids is between 15-21 degrees Celsius]; D --> D1[• Rehydration should begin immediately]; D --> D2[• It is recommended to drink at least 150% of the weight lost within the first 6 hours after exercising];
```

### Pre-exercise

- Slowly drink 5 to 7 ml/kg during the 4 hours before exercising
- In hot humid environments, consume 500 ml in the preceding hour.
- Salty foods help stimulate thirst and fluid retention.

### During exercise

- Compensate for lost liquids after 30 minutes
- Drink 6 to 8 ml of liquid per kg of weight and hour of exercise
- The ideal temperature of liquids is between 15-21 degrees Celsius

### Post-exercise

- Rehydration should begin immediately
- It is recommended to drink at least 150% of the weight lost within the first 6 hours after exercising

# ALCOHOL I OPORAVAK

**Reduced muscle glycogen synthesis**  
Mainly because guidelines for rapid glycogen synthesis are not followed

**Reduces cognitive function day after**  
which can decrease performance and increase risk of injury

**Sleep quality**  
may interfere with sleep quality



**Alcohol**

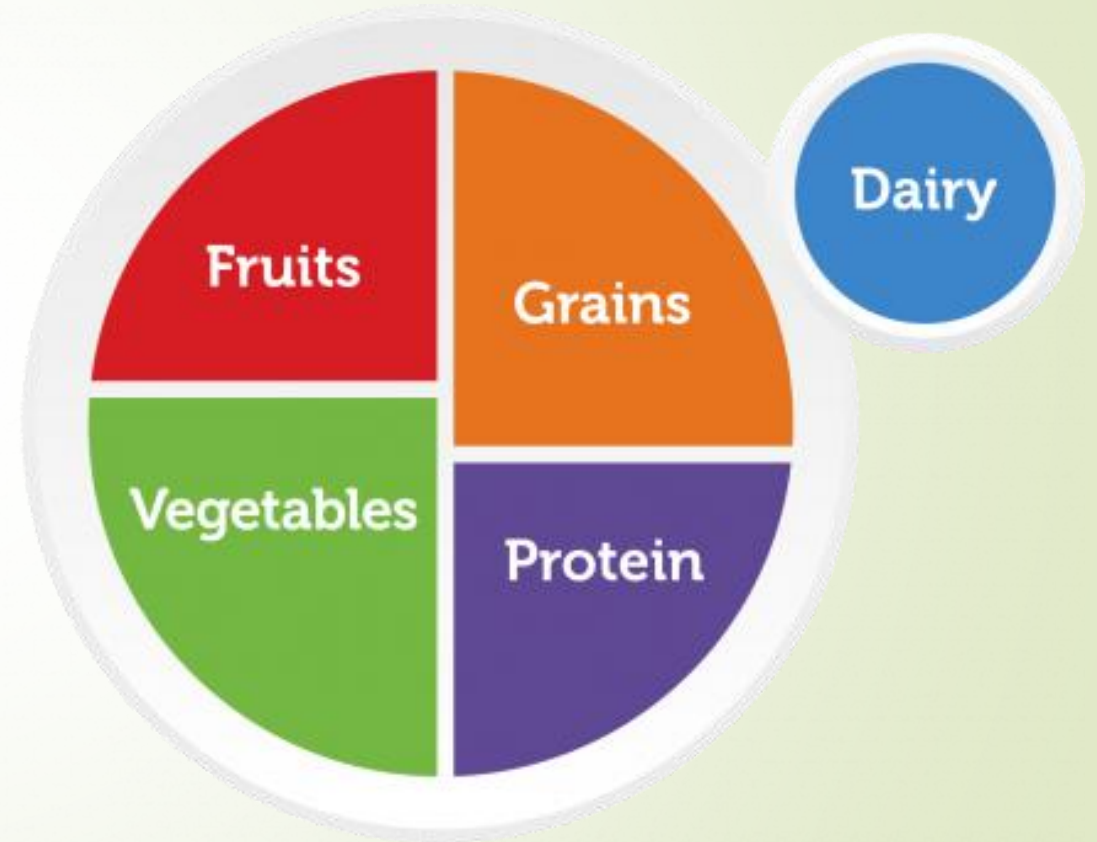


**Reduces protein synthesis**  
Impaired muscle repair and adaptation

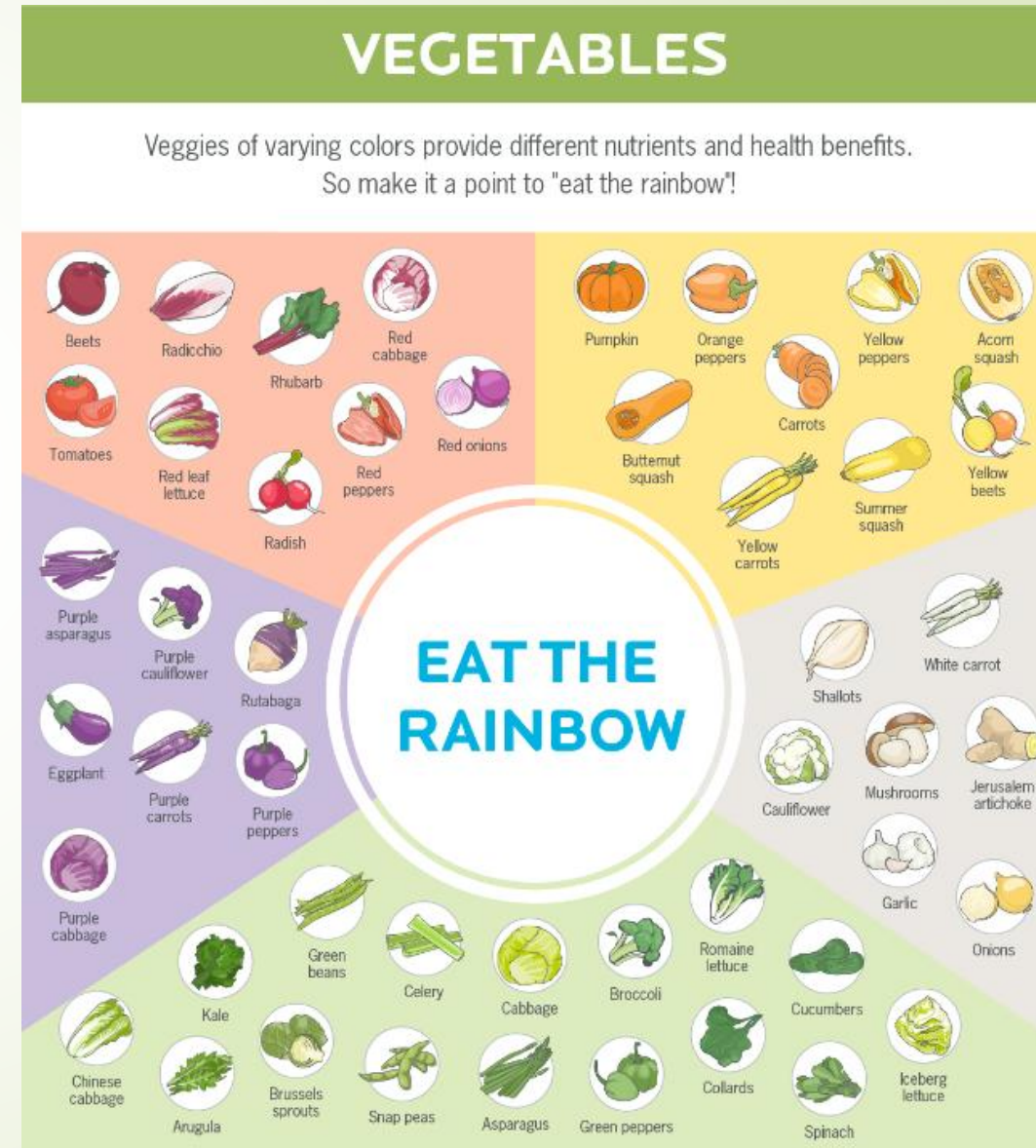
**Reduces upper body power**  
as well as peak power



# SPORTSKE PERFORMANSE I OPORAVAK



# Prehrambene namirnice: POVRĆE i VOĆE (ugljikohidrati)



# VLAKNA ZA ZDRAVLJE I DUGOVJEČNOST (NAKON MD+1)

## SOLUBLE FIBER

Citrus



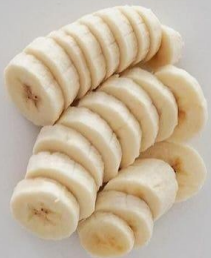
Peas



Beans & Lentils



Bananas



Dark Leafy Greens



Psyllium Husk

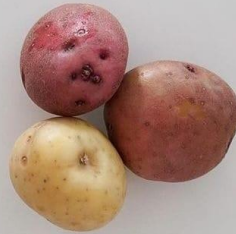


## INSOLUBLE FIBER

Nuts



Potatoes



Cauliflower



Coconut



Seeds



Whole Grains



## RESISTANT STARCH

Unripe  
Banana/Mango



Lentils



Tiger Nuts



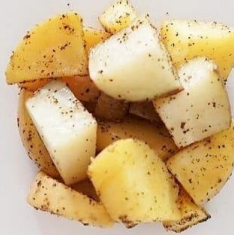
Cooked & Cooled  
Rice



Cashews



Cooked & Cooled  
Potato



# Popis preporučenih namirnica - INDIVIDUALIZACIJA

| Malomasni izvori proteina | Povrće        | Voće               | Žitarice i škrobno povrće | Masnoće               |
|---------------------------|---------------|--------------------|---------------------------|-----------------------|
| Piletina bez kože         | Blitva        | Ananas             | Riža                      | Razna ulja            |
| Puretina bez kože         | Brokula       | Borovnica          | Tjestenina                | Kikiriki              |
| Jetrica (razna)           | Cikla         | Breskva            | Rižini rezanci            | Badem                 |
| Svinjski but              | Cvjetača      | Grožđe             | Kvinoja                   | Lješnjak              |
| Teleći but                | Gljive        | Jabuka             | Amarant                   | Pistacio              |
| Meso divljači             | Kelj          | Jagoda             | Proso                     | Indijski oraščić      |
| Tuna (bez ulja)           | Krastavac     | Kruška             | Ječam                     | Maslac od orašida     |
| Oslić                     | Kupus         | Kupina             | Kus-kus                   | Suncokretove sjemenke |
| Orada                     | Luk           | Lubenica           | Heljda                    | Lanene sjemenke       |
| Brancin                   | Mahune        | Malina             | Palenta                   | Sezamove sjemenke     |
| Srdele                    | Matovilac     | Mandarina          | Griz                      | Bučine sjemenke       |
| Plodovi mora              | Mrkva         | Mango              | Zobene                    | Chia sjemenke         |
| Skyrella (masa x2)        | Paprika       | Naranča            | Rižini krekeri            | Avokado (masa x4)     |
| Bjelanjak (masa x2)       | Patlidžan     | Nektarina          | Cornflakes                | Masline (masa x4)     |
| Posni sir (masa x2)       | Poriluk       | Šumsko voće        | Mlinci                    | Tartar                |
| Skyr (masa x2)            | Prokulice     | Trešnja            | Kruh                      | Majoneza light        |
| Zrnati sir (masa x2)      | Radič         | Višnja             | Tortilje                  | Vrhnje 12% (masa x3)  |
| Kvark (masa x2)           | Rajčica       | Banana (masa x0,5) | Krumpir                   | Žuti sirevi           |
| Sejtan (masa x0,67)       | Rikola        |                    | Batat                     | Feta sir              |
| Jaja*                     | Šparoge       |                    | Njoki (masa x0,5)         | Mozzarella, punomasna |
| Masnije meso*             | Špinat        |                    | Grah                      | Mlijeko               |
| Masnija riba*             | Tikvica       |                    | Leća                      | Jogurt                |
| Tofu*                     | Zelena salata |                    | Slanutak                  | Kefir                 |
| Mozzarella light*         |               |                    | Grašak                    |                       |
| Whey                      |               |                    | Kukuruz                   |                       |

# ZAKLJUČCI

## Take home messages

Research.

Plan.

Provide **optimal support.**

Focus on increasing **CHO and fluid** intake before and during the match and supporting the optimal recovery with **high CHO and high protein** intake after the match.

Consider **individual differences.**

**KEEP IT SIMPLE BUT POWERFUL.**



seb\_orlic



[www.kvaliteta-zivota.hr](http://www.kvaliteta-zivota.hr)



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Sebastijan Orlic



Fitnes učilište

2X TJEDNO



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