

# HEAT/HUMIDITY VS FLUID/ELECTROLYTES

How we respond to the hot environment and  
how to stay at the top of your game.

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# BODY BASICS

- 60% of body weight is water
  - up to 70% if lean, down to 50% if fat
  - 1 liter of water = 1 kilogram of weight
- Major electrolytes
  - Sodium, Potassium, Hydrogen (positive charge)
  - Chloride, Bicarbonate, Phosphates, Sulfates (neg)
- Cells and their electrolytes are the “batteries” of our body
  - energy is derived from electrolyte ions
- Homeostasis

# WATER LOSS

- Overheating via activity and sweating
  - fatigue, dizziness, dec focus, disorientation, confusion
- Heat Exhaustion
  - Body temp  $> 100$ : cramps, headache, n/v
  - We begin to absorb heat from environment
  - Fluid and electrolyte replenishment
- Heat Stroke
  - Body temp  $> 104$ : organ failure (kidney: dec urine, liver: inc toxins, heart: inc HR, dec BP, dec brain perfusion); death
  - Cessation of sweating (Know this one!!); euphoria
  - Rapid cooling by water/ice immersion; IV fluids

# INTERNAL TEMPERATURE FACTORS

- Body size
- Fitness level
- Exercise intensity
- Environmental heat & humidity
- Hot weather acclimation
- Specificity training

# HOW WE REDUCE INTERNAL TEMPERATURE

- Sweat glands pump water through skin
- Heart pumps blood to skin and skin vessels dilate to export heat
- Humidity, with ambient air heavy with water, sweat cannot evaporate from skin
  - Wipe it away with a towel
  - Change at halftime
  - Under Armour/ wicking material

# REDUCING YOUR RISK

- Acclimate to the heat!!!!!!
  - People who exercise in the heat have:
    - Lower resting body temperature
    - Decreased HR
    - Quicker, more generous sweating
- Prepare for the heat
  - 10-14d of regular exercise in the heat, slowly building to intense workout at hottest times of the day
  - Most problems are in first heat wave or coming from cooler to hotter climate
  - Specificity training

# REDUCING YOUR RISK

- Hydration

- Increased water => increased sweat/cooling
- Increased blood volume => blood to skin
- Cold fluids before: until your urine runs clear
- Drink during the game even if not thirsty
- Room temperature fluids after: satiety
- Sports drinks: Sodium, Potassium, Chloride
- Replace fluid as its lost

# MISCELLANEOUS

- Drugs
  - Caffeine, alcohol, diuretics/BP meds,
- Can you drink too much? (Hyponatremia)
- Warm-up to prepare for heat
- Relaxed stretching after warm-up
- Cool down afterwards
- Get out of the sun, ice pack, cool shower
- “The solution to pollution is dilution”