

Performance in hot and humid environments

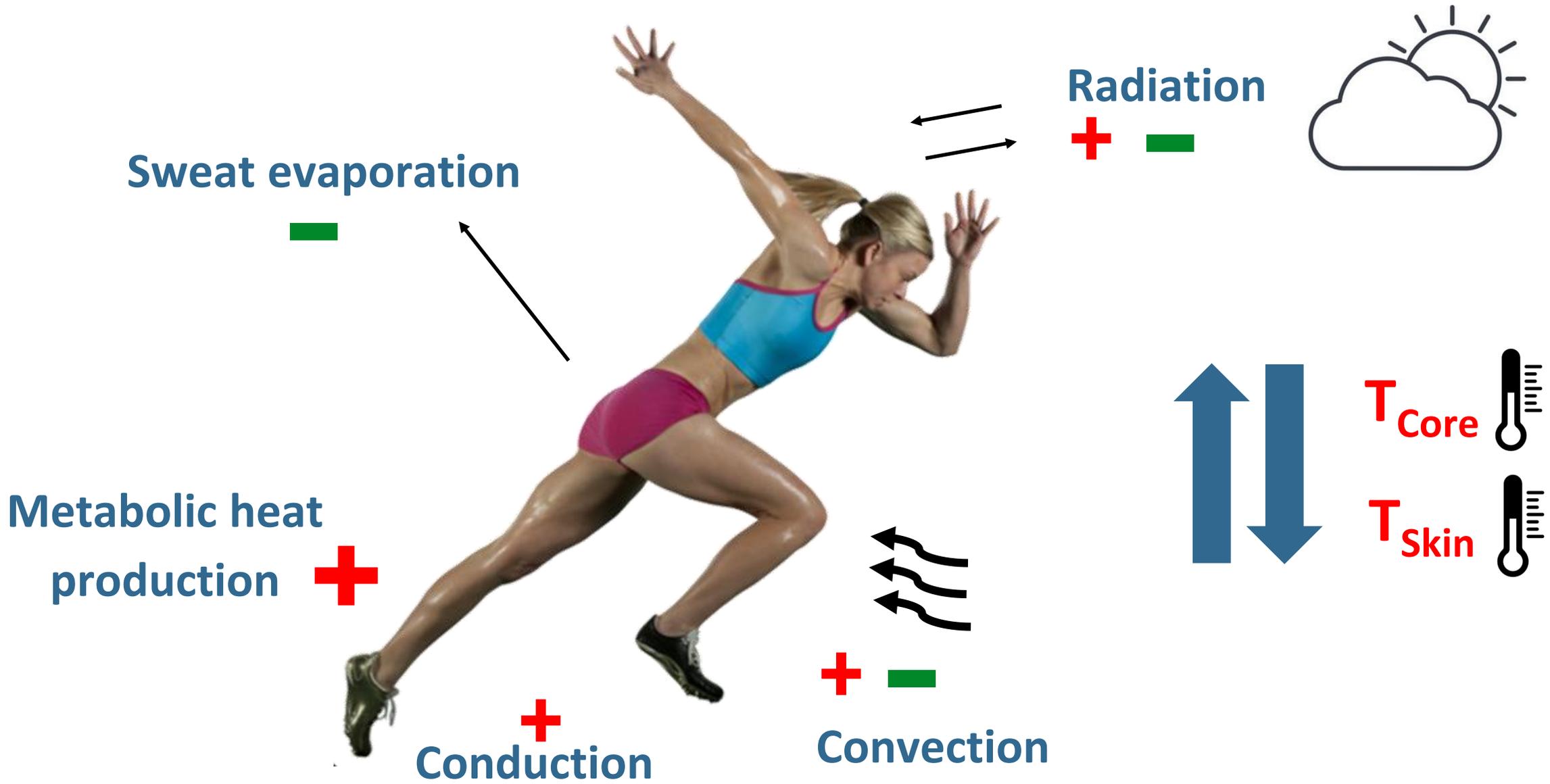
Cooling strategies



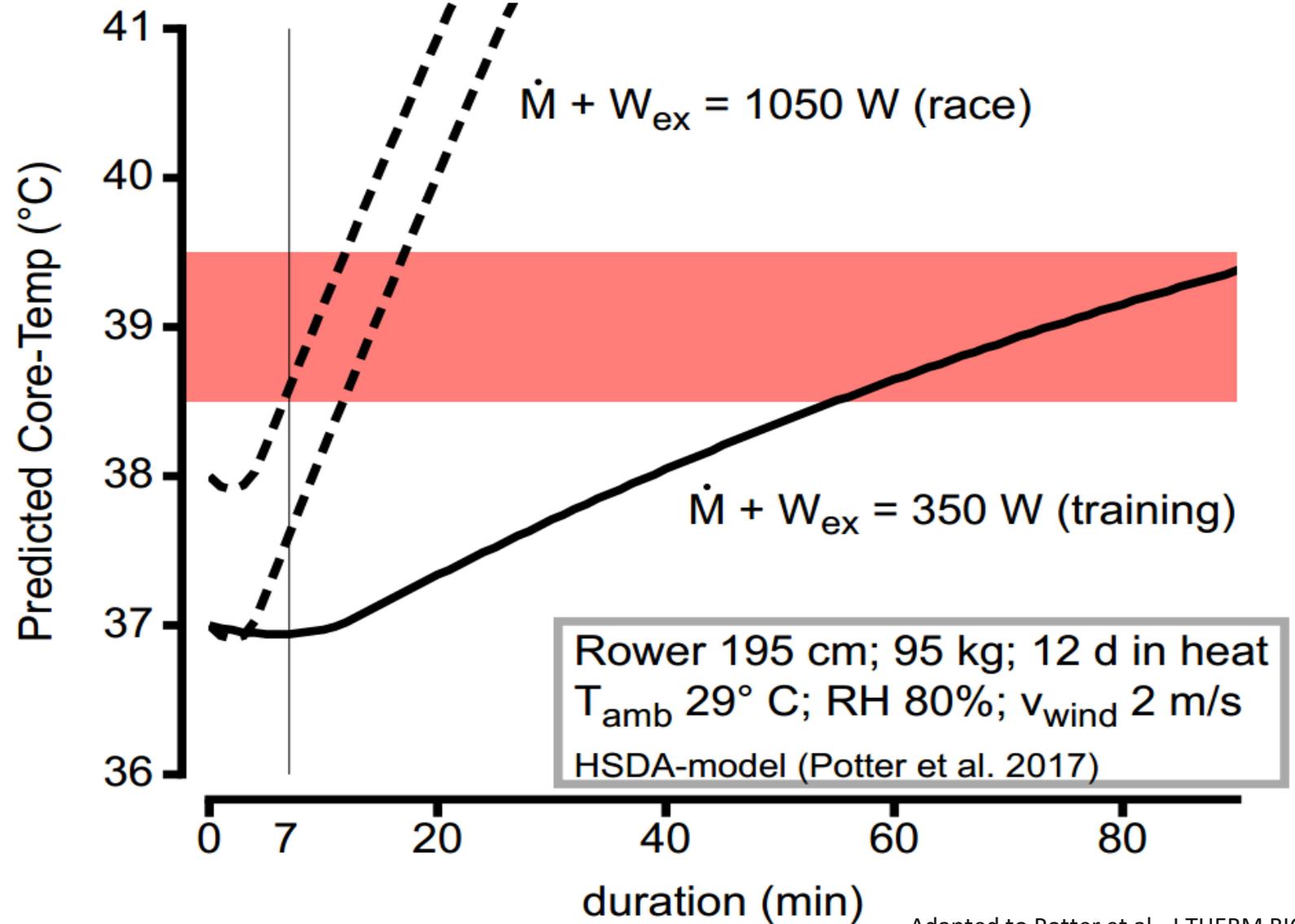
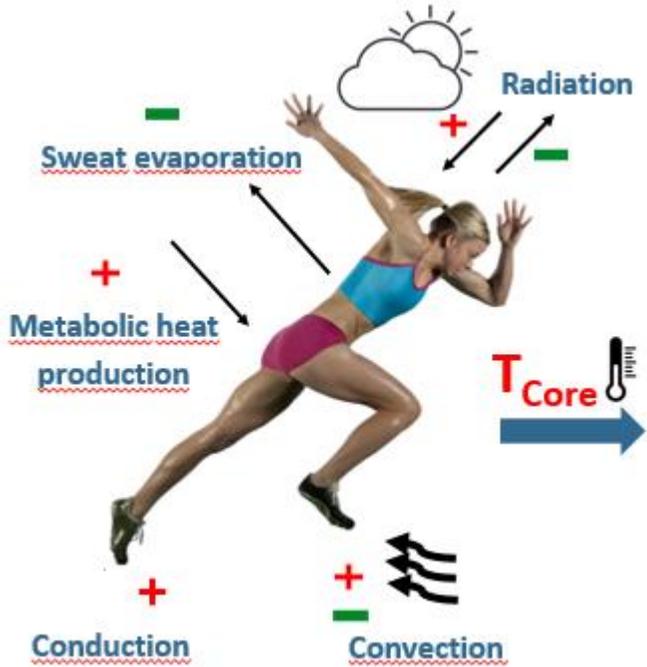
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Heat stress and rowing performance

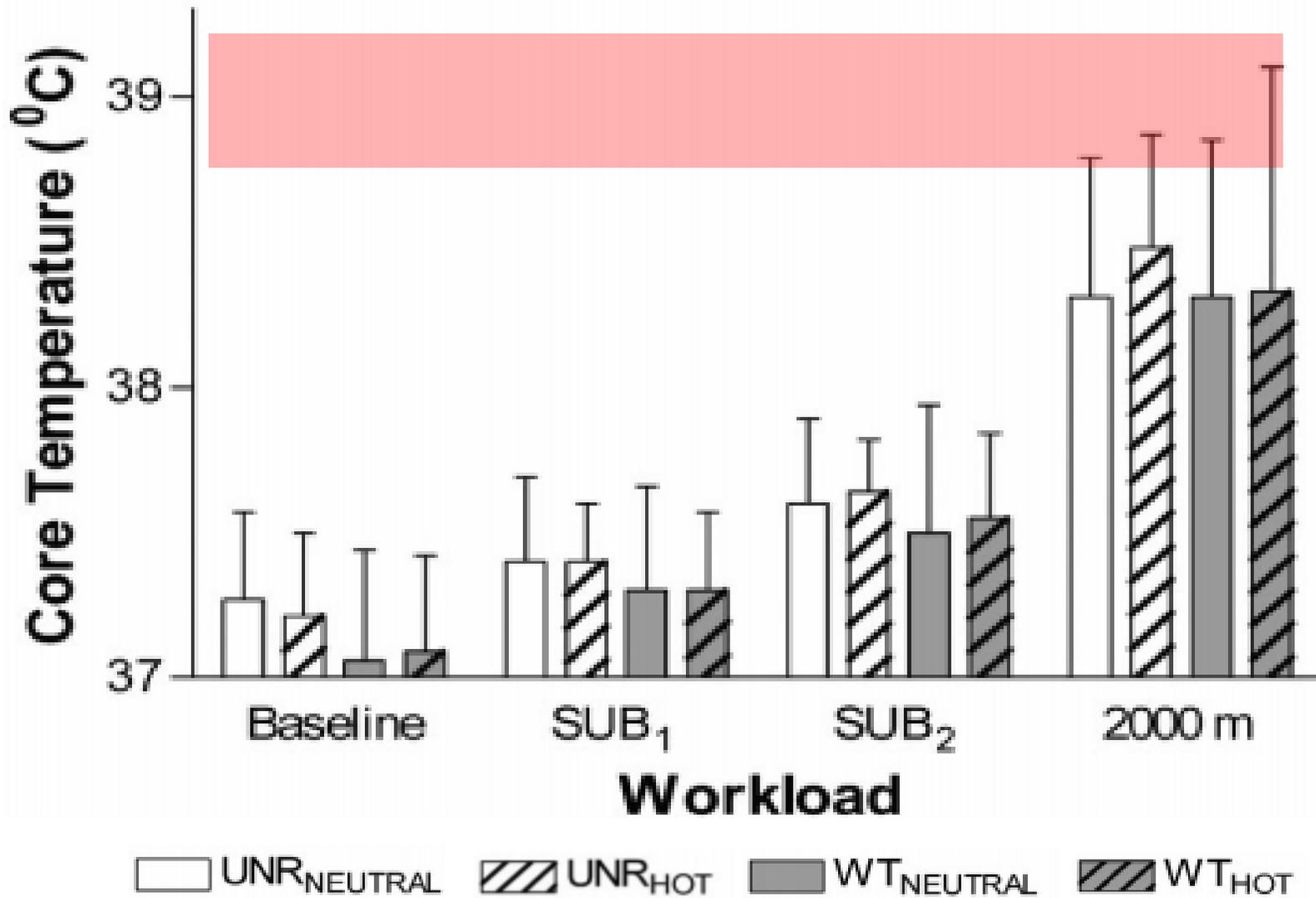


Heat stress and rowing performance



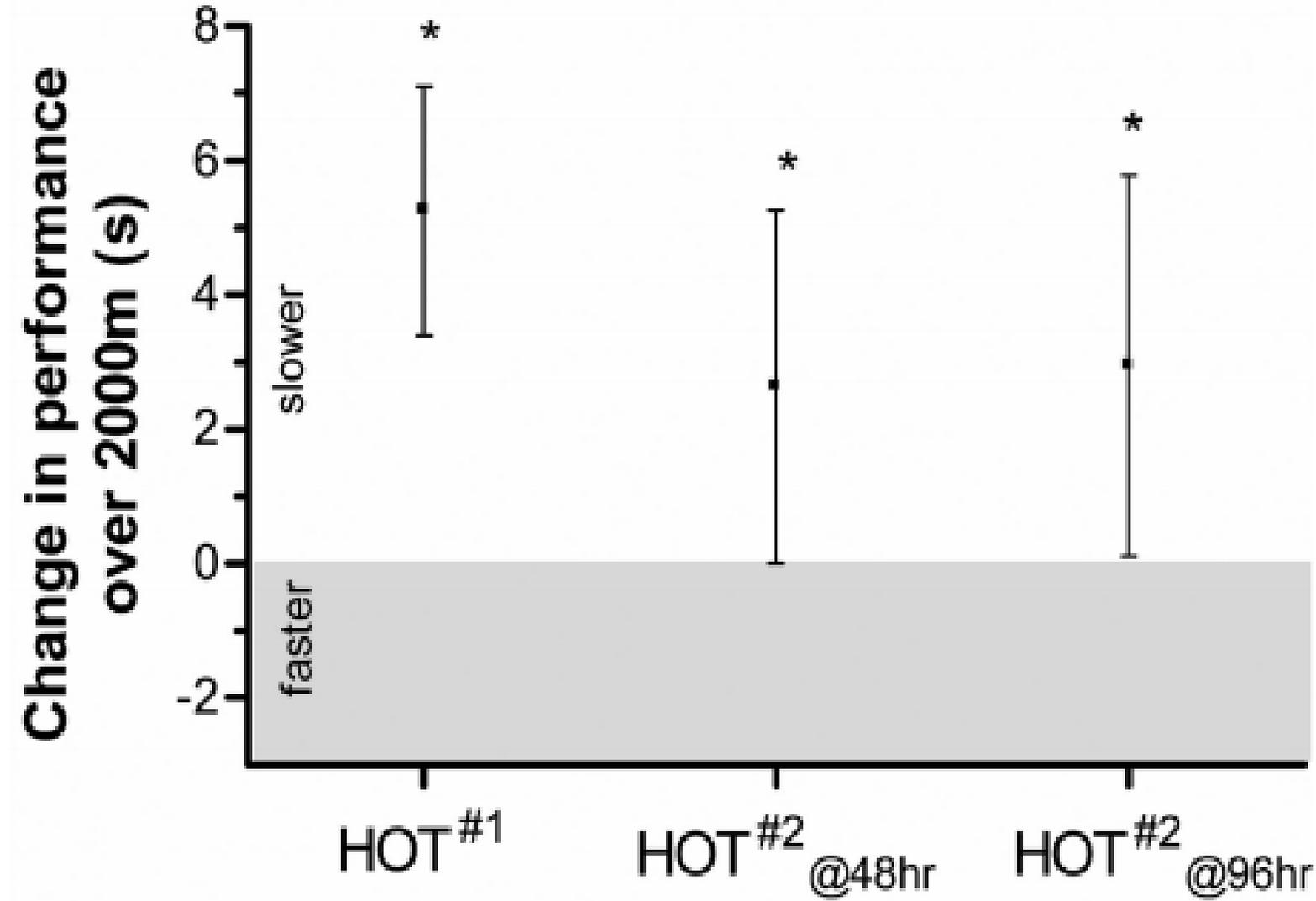
Adapted to Potter et al., J THERM BIOL, 2017

Heat stress and rowing performance



Slater et al., MSSE, 2005

Heat stress and rowing performance



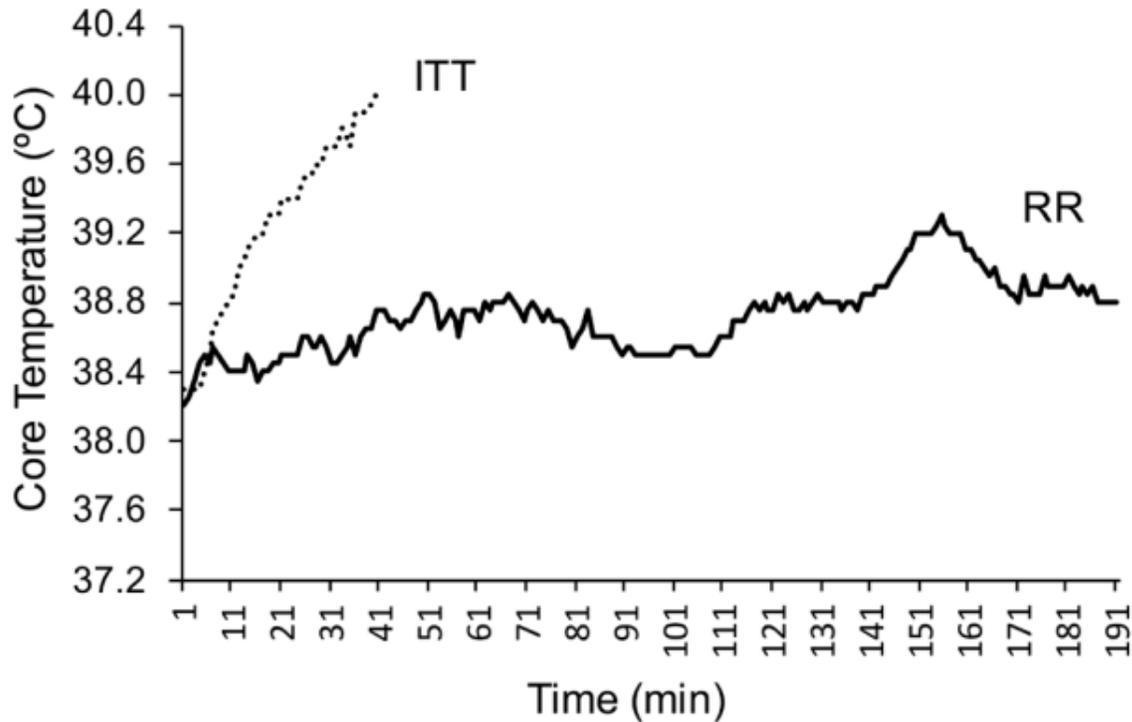
Slater et al., MSSE, 2005

Monitoring Heat stress

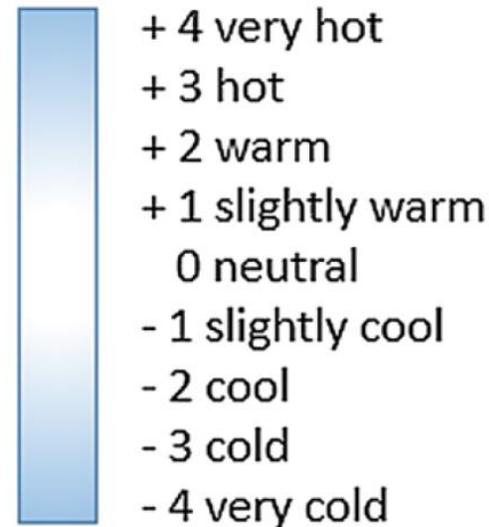
Thermal pill



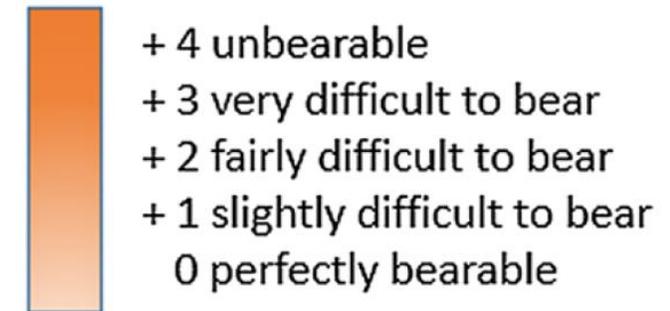
Scale



Thermal Perception



Thermal Tolerance



Racinais et al., BJSM 2018

Cooling – Why & How

Goal

„Save“ Performance

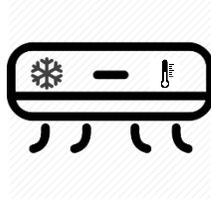


„Save“ Thermal comfort



Methods

External



Internal



Timing

Pre 

Per 

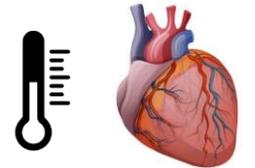
Post 

Effects

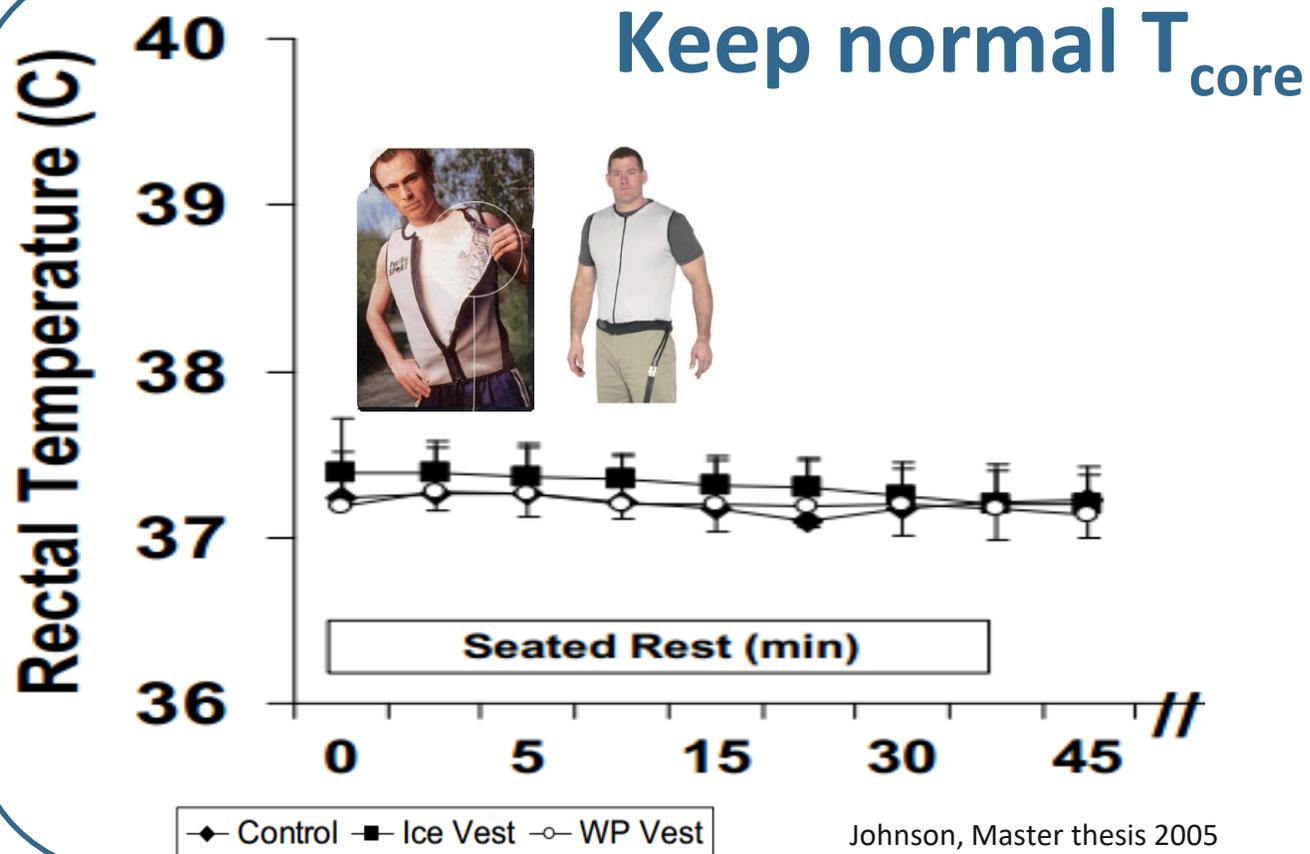
↑ Heat storage capacity



↓ Thermal strain



Pre Cooling - Strategies



7.5 g/kg BM
30 min pre

Naito et al, J Physiol Anthropol. 2017

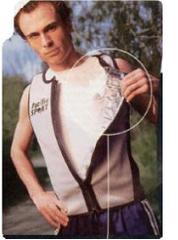
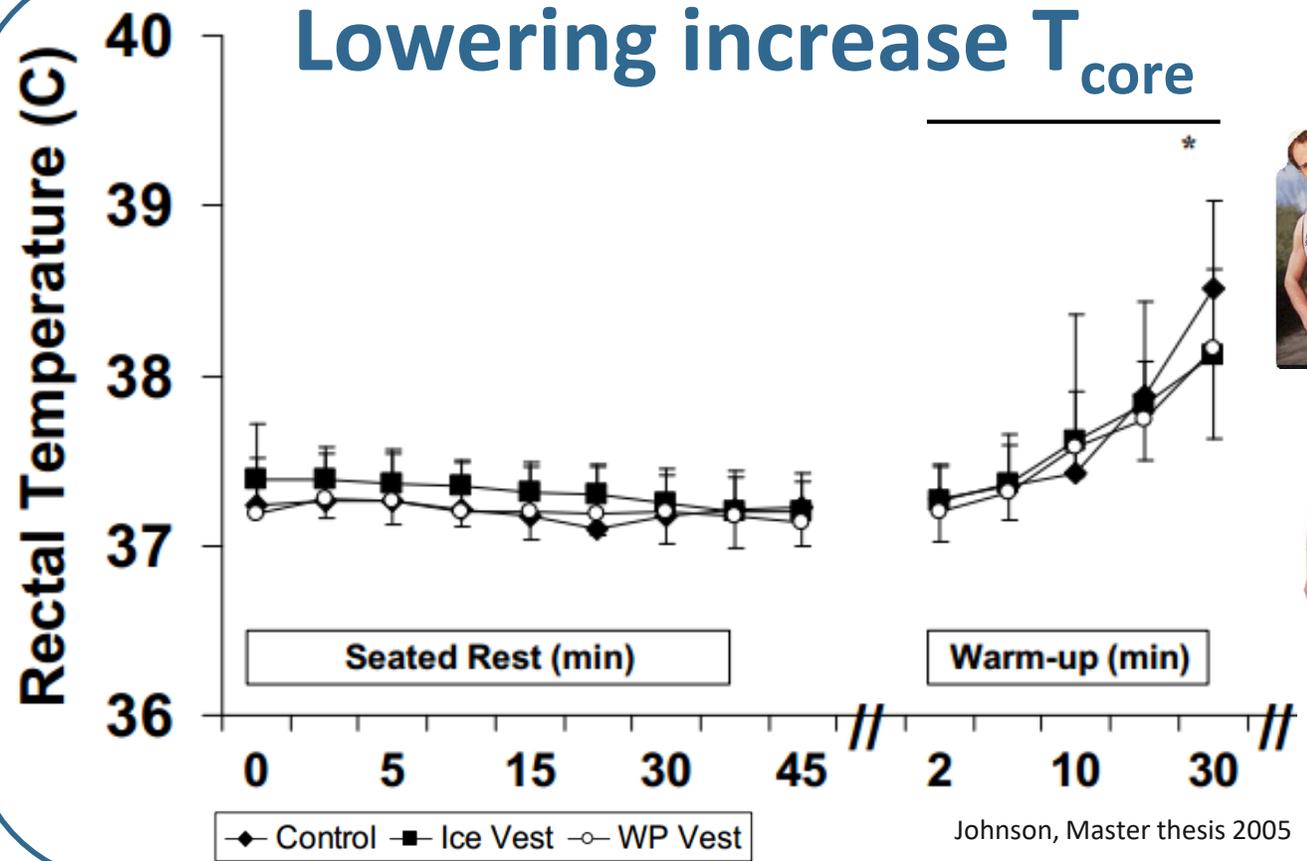


5-25 min
12-25°C

White et al., J Appl Physiol.2003; Siegel et al., J Sports Sci. 2012



Warm-up Cooling - Strategies



Per Cooling - Strategies

Improve heat loss



newwave.de



Post Cooling - Strategies

Normalize T_{core}



10-25 min
12-15°C

White et al., J Appl Physiol. 2003;
Siegel et al., J Sports Sci. 2012



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Pre



Warm-up



Start



Per



Finish



Post



Cool-down

Cool-down Cooling - Strategies

Avoid heating up and recover



arcticheat.com



Pre



Warm-up



Start



Per



Finish



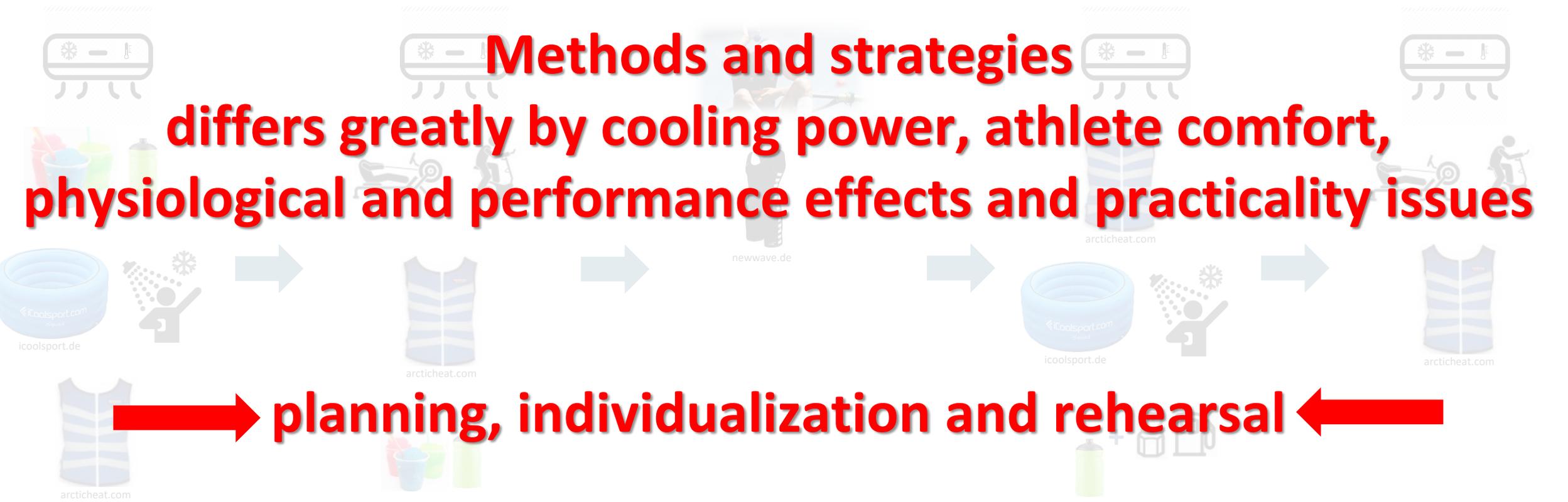
Post



Cool-down

Cooling - Strategies

Methods and strategies differs greatly by cooling power, athlete comfort, physiological and performance effects and practicality issues



Hydration & Refueling

Sweating rate (SR)

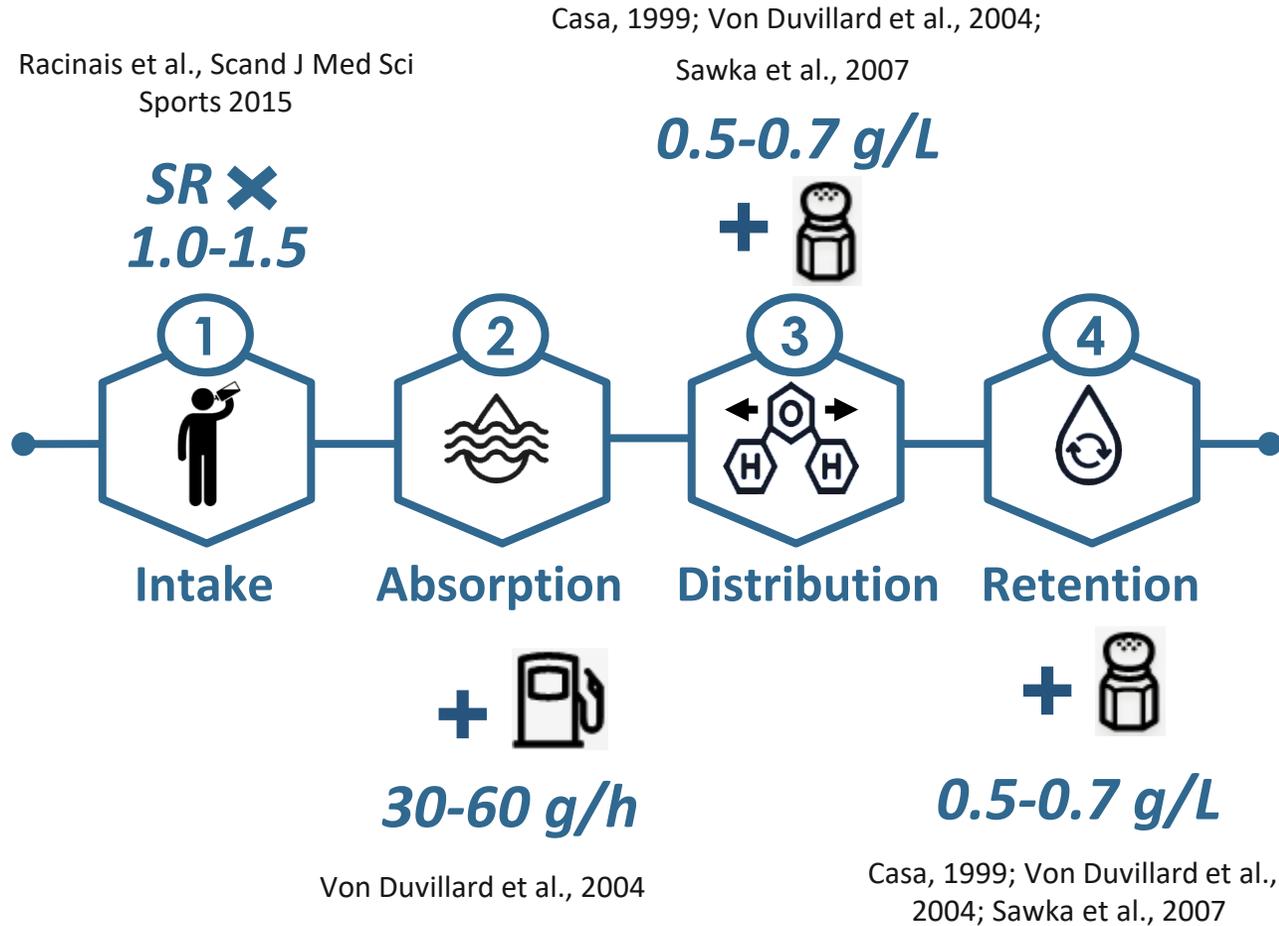


1165 mL/h at 10°C

vs.

1980 mL/h at 32°C

Burke, CBP 2000



- **Heat stress impairs performance (and health)**
 - Heat stress should be managed & monitored
- **Cooling strategies are likely to improve performance under hot and humid conditions**
 - Effects determined by method, timing, modality & individual characteristics etc.
 - planing, individualization and rehearsal
- **Hydration & refueling must be adapted for special needs of hot and humid conditions**
 - Start hydrated, rehydrate aggressively
 - planning, individualization and rehearsal

Prepare for the Worst and hope for the Best!



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