

eCelsius® Performance brochure

A system for a reliable and accurate temperature monitoring

*Scientifically validated
Gold standard for temperature monitoring*

Summary

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Current human field applications

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eCelsius Performance specifications

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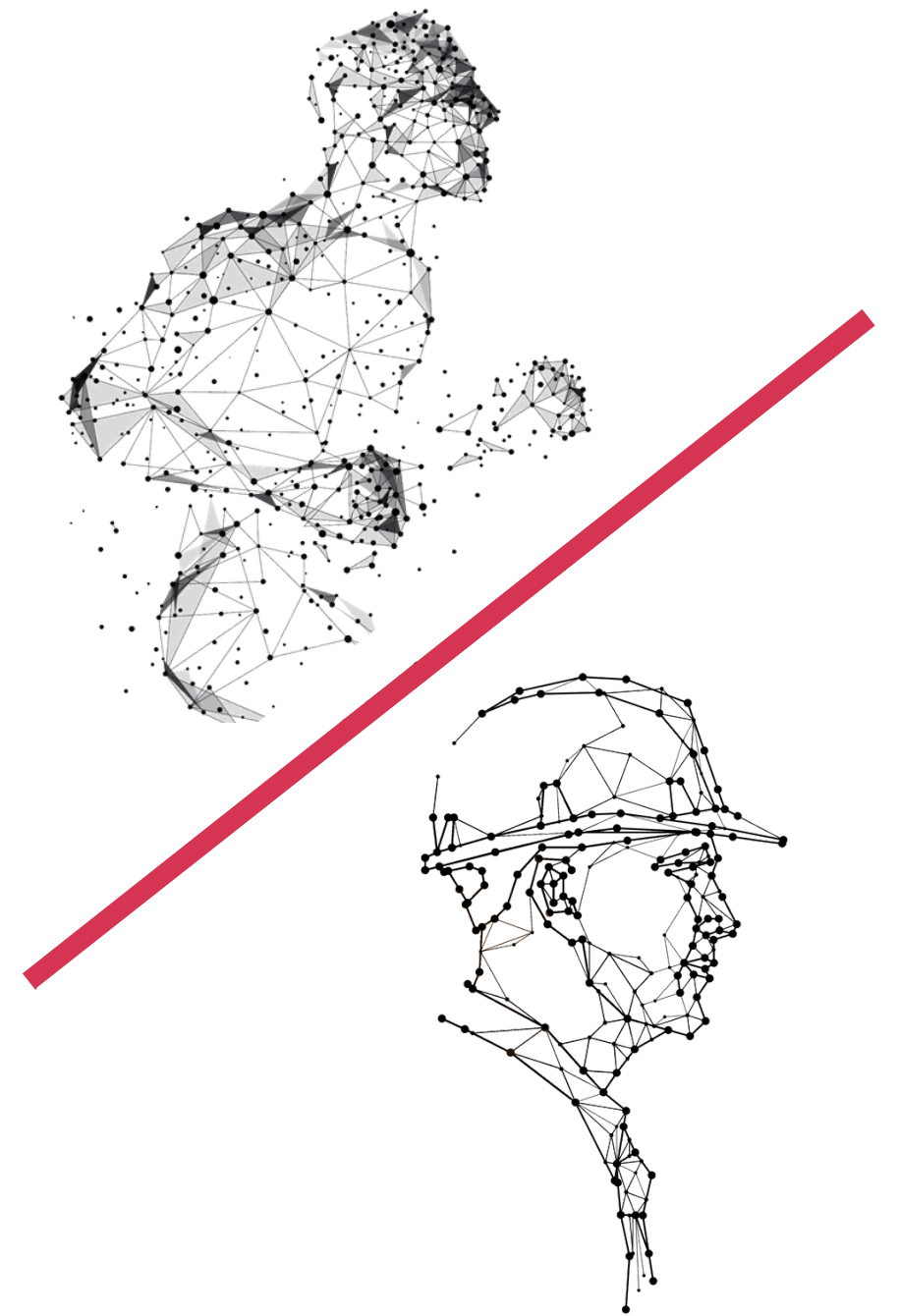
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Examples of research study

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Current human field applications



Current human field applications

Few examples



SPORTS APPLICATIONS

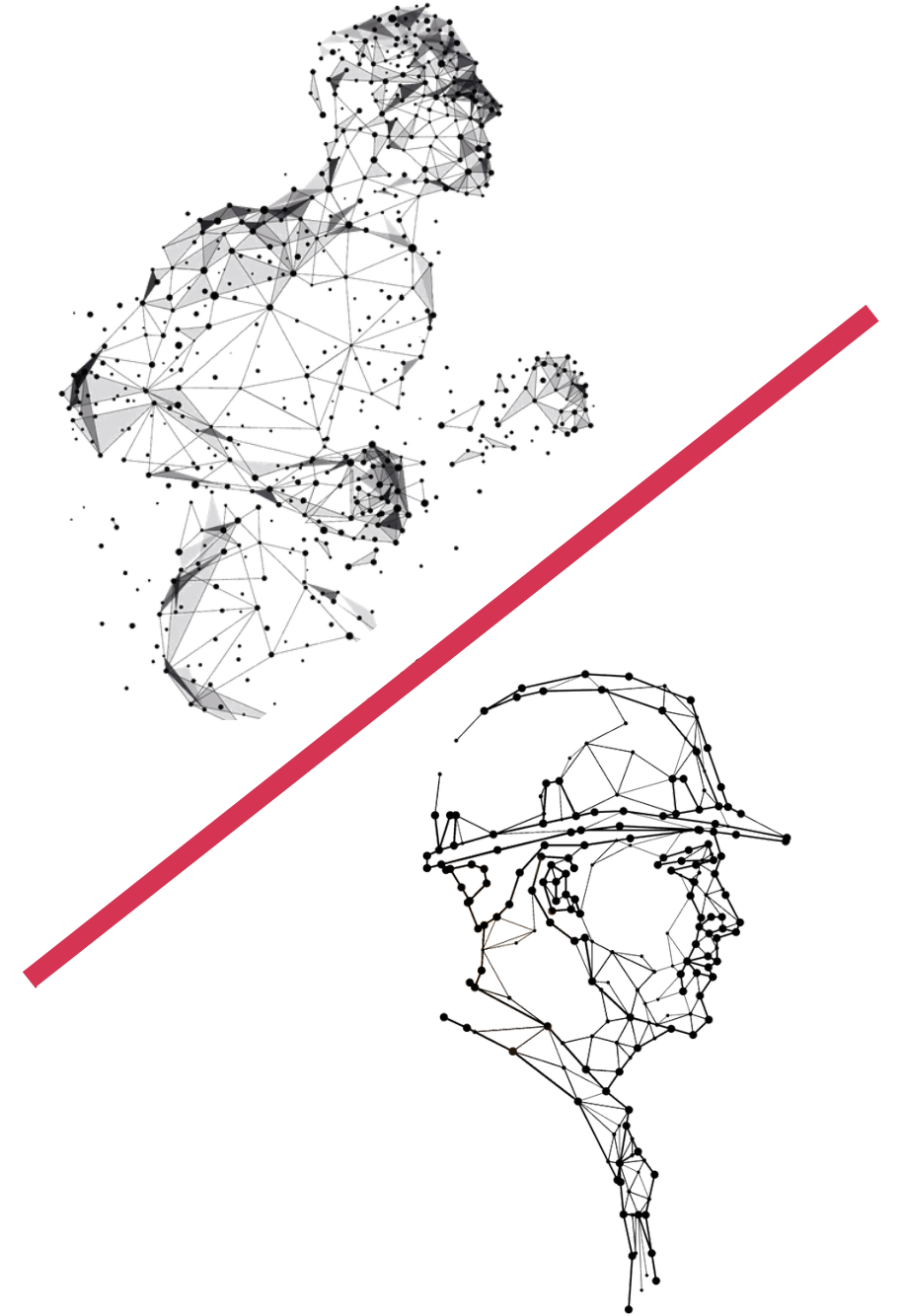
- Hypothermia/Hyperthermia prevention
- Thermoregulation - Heat acclimatization
- Warm up – recovery process optimization
- Performance assessment/optimization
- Preventing, quantifying and avoiding the Jet-Lag issue



OCUPATIONNAL HEALTH APPLICATIONS

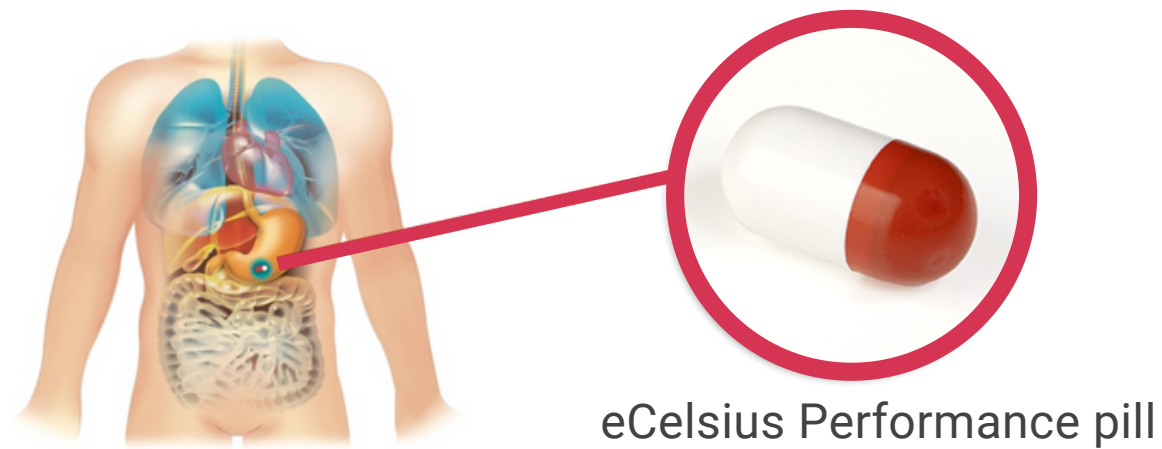
- Temperature monitoring for soldiers
- Temperature control for fireman, rescue divers
- Thermoregulation - Heat stroke prevention

About eCelsius® Performance



Introduction

eCelsius® Performance: the essentials



RF 433Mhz



eViewer Performance
monitor



Activation box to turn on the pill



ePerformance Manager
software

Communication range in real time : from 1 to 3 m (subject & environment depending)

About eCelsius® Performance

Specifications



eCelsius Performance CAPSULE SPECIFICATION

Capsule cleaning	Standardized cleaning process
Size (diameter x length)	17.7mm x 8.9mm
Weight	1.7g
Temperature accuracy	+/- 0.2 °C (+/- 0.36°F)
Temperature resolution	0.01°C (0.03202°F)
Life duration	20 days
Shelf life	2 year
Measurement period available	15s, 30s, 1min 2min, 5min,
Temperature range	25° - 45°C (77-113°F) below 25°C, consult us

Minimum weight 40kg



eCelsius Performance ACTIVATOR SPECIFICATION: to turn on the pill

Size	69mm x 59mm x 31mm
Shelf life	2 years



e-Viewer® MONITOR SPECIFICATION: to visualize and record the data collected

Size	120mm x 70mm x 15mm
Number of pills associated	Up to 3 pills
Storage	150 000 data per pill
Autonomy	24/36h



Few parameters may impact the performance of the system:

- The subject morphology
- The environment (metal, ...)
- Your own protocol

We can advise & help you define the best configuration for your study.

eCelsius® Performance added value

Technical specifications:



PILL INTERNAL MEMORY

Embedded memory in the pill allows to continuously store the last 2000 collected data independently of the life duration.



MEASUREMENT PERIOD

Several sampling frequency are available and can be changed all along the monitoring.



SIMPLE WAY OF WORKING

After activation and ingestion, the capsule automatically collects and transmits accurate and reliable temperature data to the eViewer monitor.



ACCURATE DATA

eCelsius Performance guarantees you an accuracy of +/- 0.2°C.

Other:



ADD MARKERS

Markers can be added all along the experiment to highlight a specific event.



LIGHTWEIGHT & TINY

Capsules are lightweight 1.7g and measure 17.7mm x 8.9mm.



DESIGNED FOR HUMAN SUBJECT

Designed only for human subject with a minimum weight of 40kg.

Scientific advantages:



NO DATA LOSS

No data loss even if the subject is out of the communication range for a while.



REAL TIME & A POSTERIORI DATA RECOVERY

If the monitor is in the communication range of the pill, you can collect real time data. If not the monitor will synchronize the missing data as soon as the pill and the monitor are in the same communication range.



ADAPTABLE MONITORING

During the monitoring, you have the possibility to change the measurement period when you want. In addition to the internal memory, the several sampling frequencies available, allows the system to fit with your protocol.



TIME SAVER

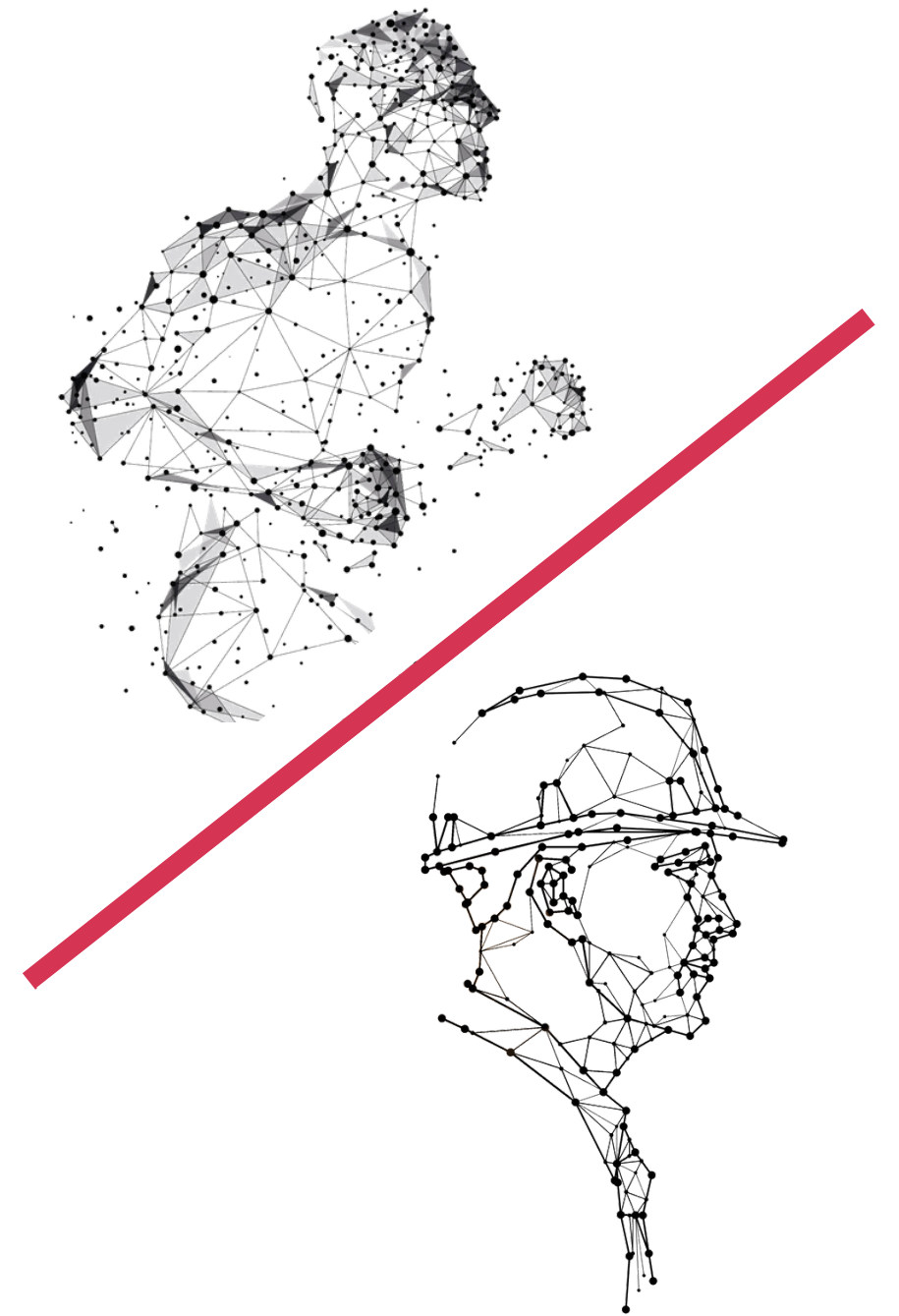
Save time thanks to quick and easy implementation.



RELIABLE MONITORING

Accurate data with a resolution of 2 digits.

Example of research studies



Example of research studies

Hyperthermia / heat stroke prevention

eCelsius® Performance ADDED VALUE

- 1 Continuous core temperature control
- 2 Health protection
- 3 Equipment, training/recovery processes assessment

Long duration exercises performed in the heat induce rise in core temperature that could range from hyperthermia to heat stroke.

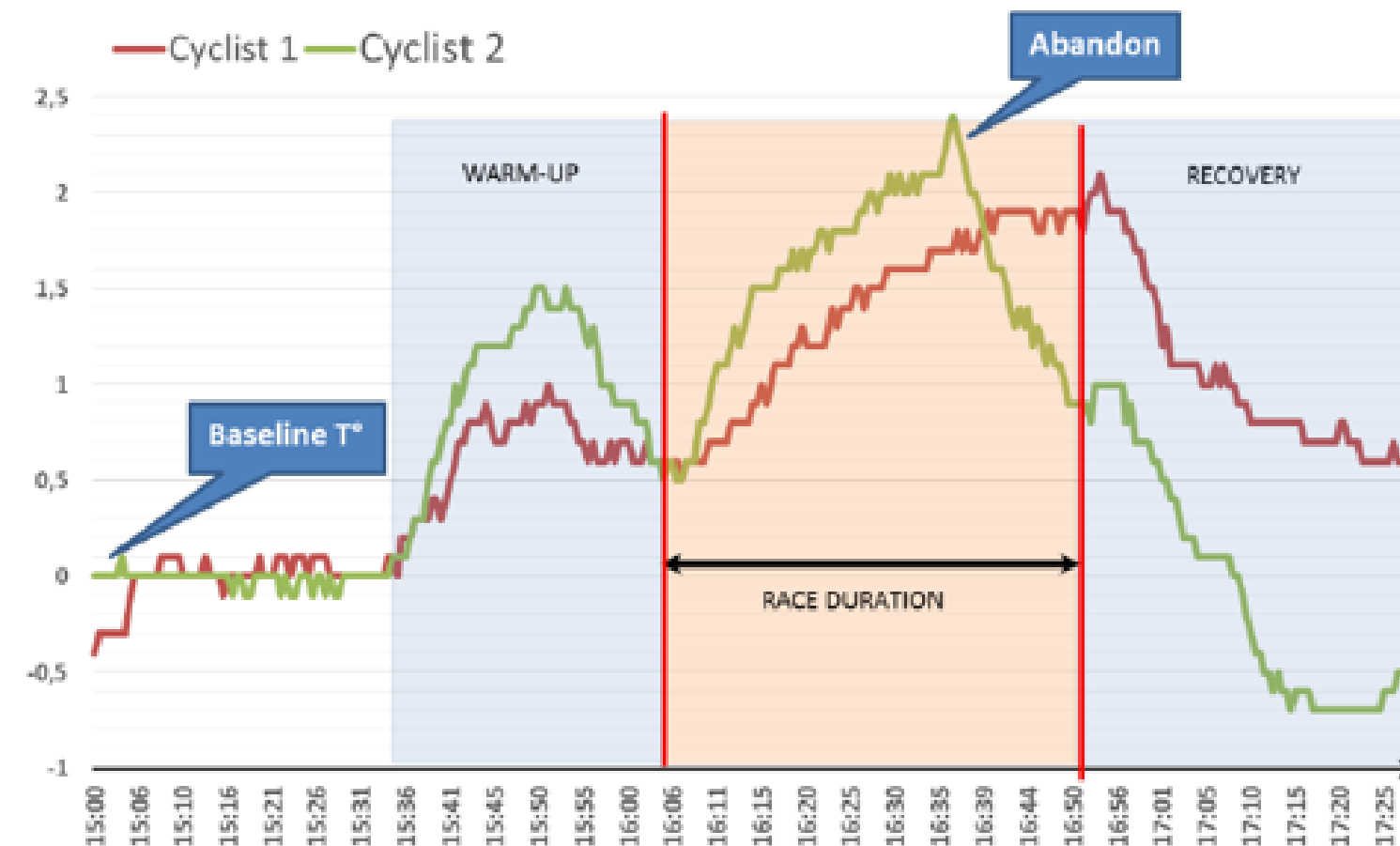
Publications:

Racinais et al., (2018) Core temperature up to 41.5°C during the UCI Road Cycling World Championships in the heat.

Stephenson et al., (2018) High Thermoregulatory Strain During Competitive Paratriathlon Racing in the Heat.

Ioannou et al., (2019) A free software to predict heat strain according to the ISO 7933:2018.

McGarr et al., (2020) Heat strain in children during unstructured outdoor physical activity in a continental summer climate.



FDJ pro cycling team, Team Time Trial - World Road Cycling Championship, (Richmond 2015)

Example of research studies

Performance optimization

eCelsius® Performance ADDED VALUE

- 1 Implementation of acclimatization program
- 2 Individual control of acclimation process
- 3 Benefits assessment

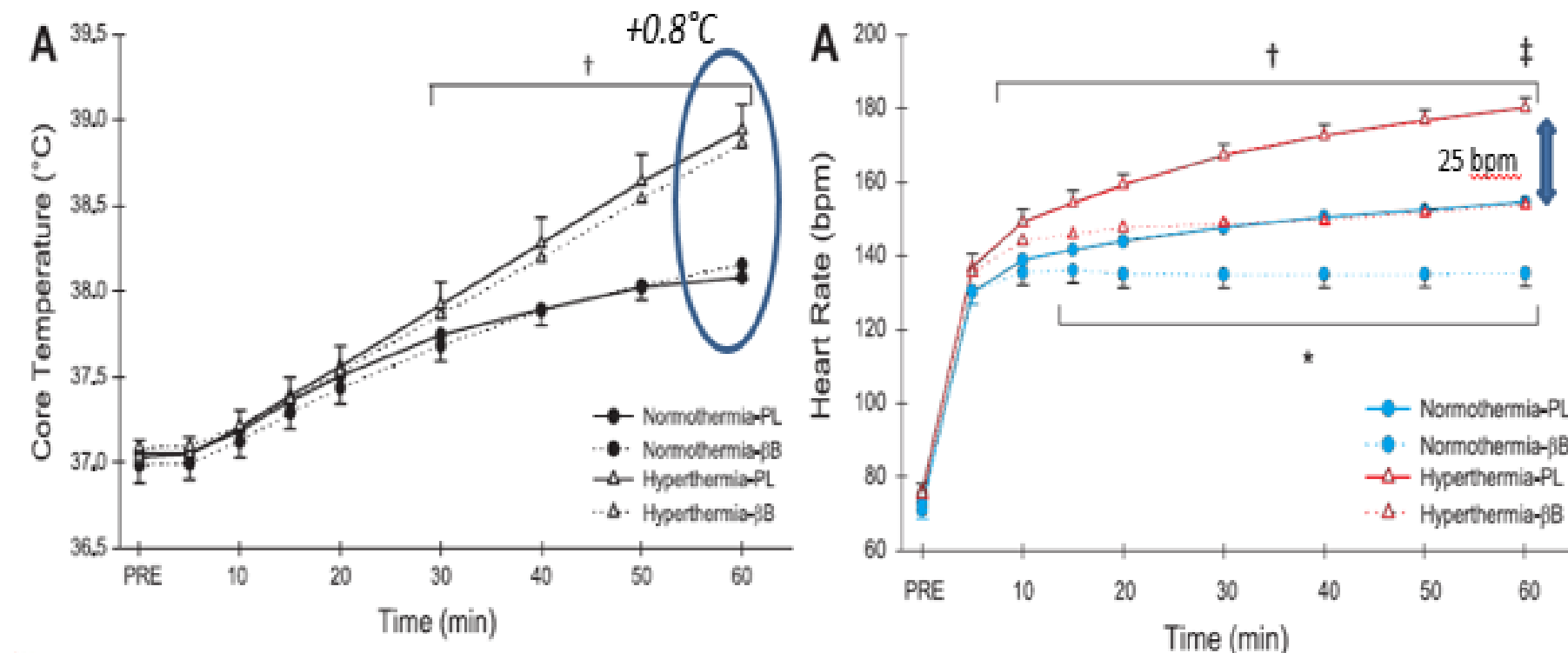
Core hyperthermia is directly correlated to performance decline. The drift of heart rate due to heat exhaustion induces a direct misappropriation of the cardiovascular effort. This loss can be avoided thanks to an individual acclimatization program.

Publications:

Roussey et al., (2018) Interactions between perceived exertion and thermal perception in the heat in endurance athletes. J. of Thermal Biol.

Schmit et al., (2018) Optimizing Heat Acclimation for Endurance Athletes: high versus Low-intensity training. Int.J. of Sports Physiol and Perf.

Stevens et al., (2018) Effect of two-weeks endurance training wearing additional clothing in a temperate outdoor environment on performance and physiology in the heat.



A rise of 0.8°C in core temperature leads to :

- a rise of 25 bpm in submaximal HR
- a significant decrease in stroke volume

Example of research studies

Assessment of thermoregulation efficiency

eCelsius® Performance ADDED VALUE

- 1 Define individual thermoregulatory profile
- 2 Implementation of individual acclimatization program
- 3 Individual control of the acclimation process
- 4 Benefits assessment

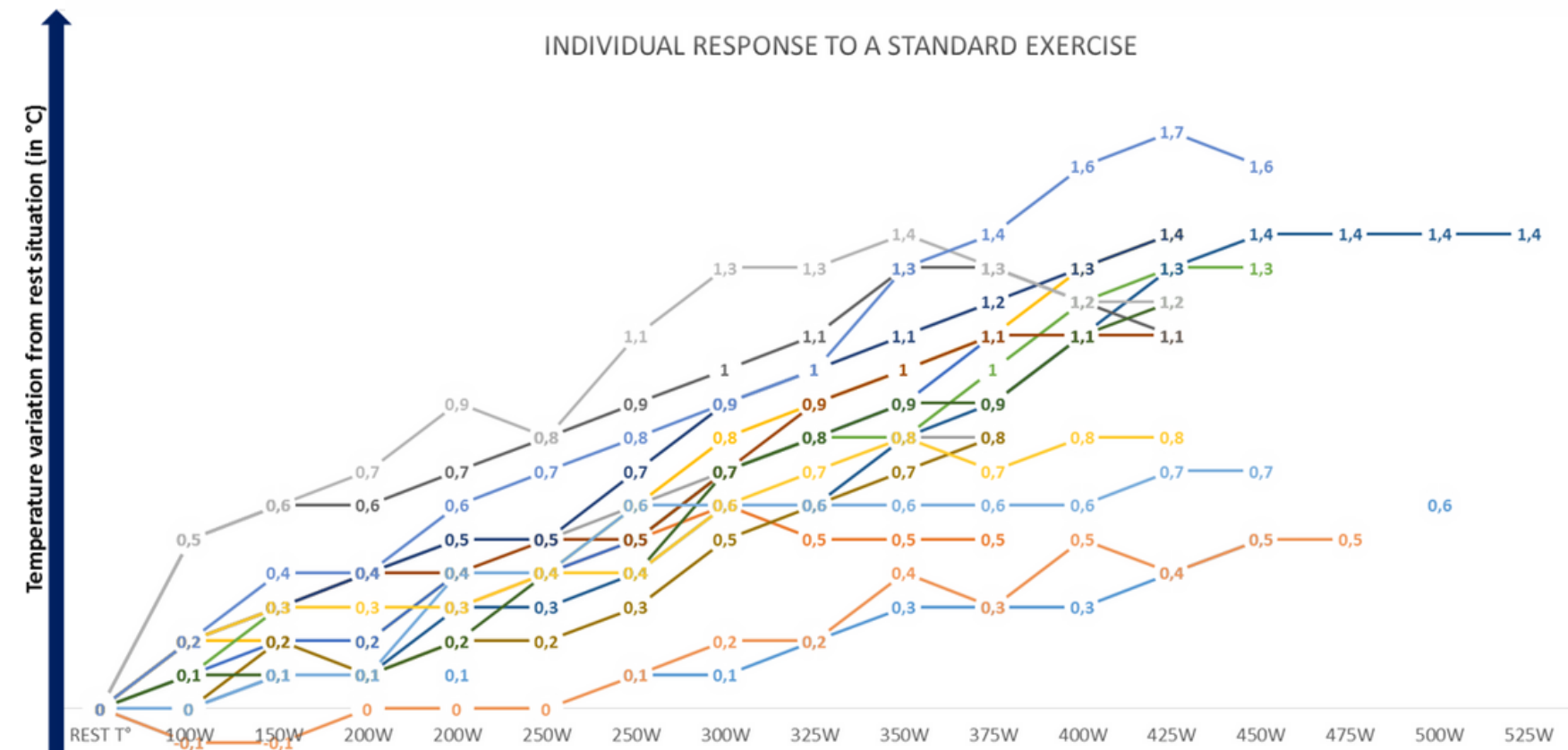
Thermoregulatory responses are very different among elite athletes. This takes the form of differences in thermoregulatory profiles, adaptations and acute physiological responses (Heart-Rate drift, ...).

Publications:

Roussey et al., (2018), Interactions between perceived exertion and thermal perception in the heat in endurance athletes.

Schmit et al., (2018), Optimizing Heat Acclimation for Endurance Athletes: high versus Low-intensity training.

Alhammoud et al.,(2020), Thermoregulation and shivering responses in elite alpine skiers.



Preseason test event with a pro cycling team (2017).

Example of research studies

Hypothermia prevention

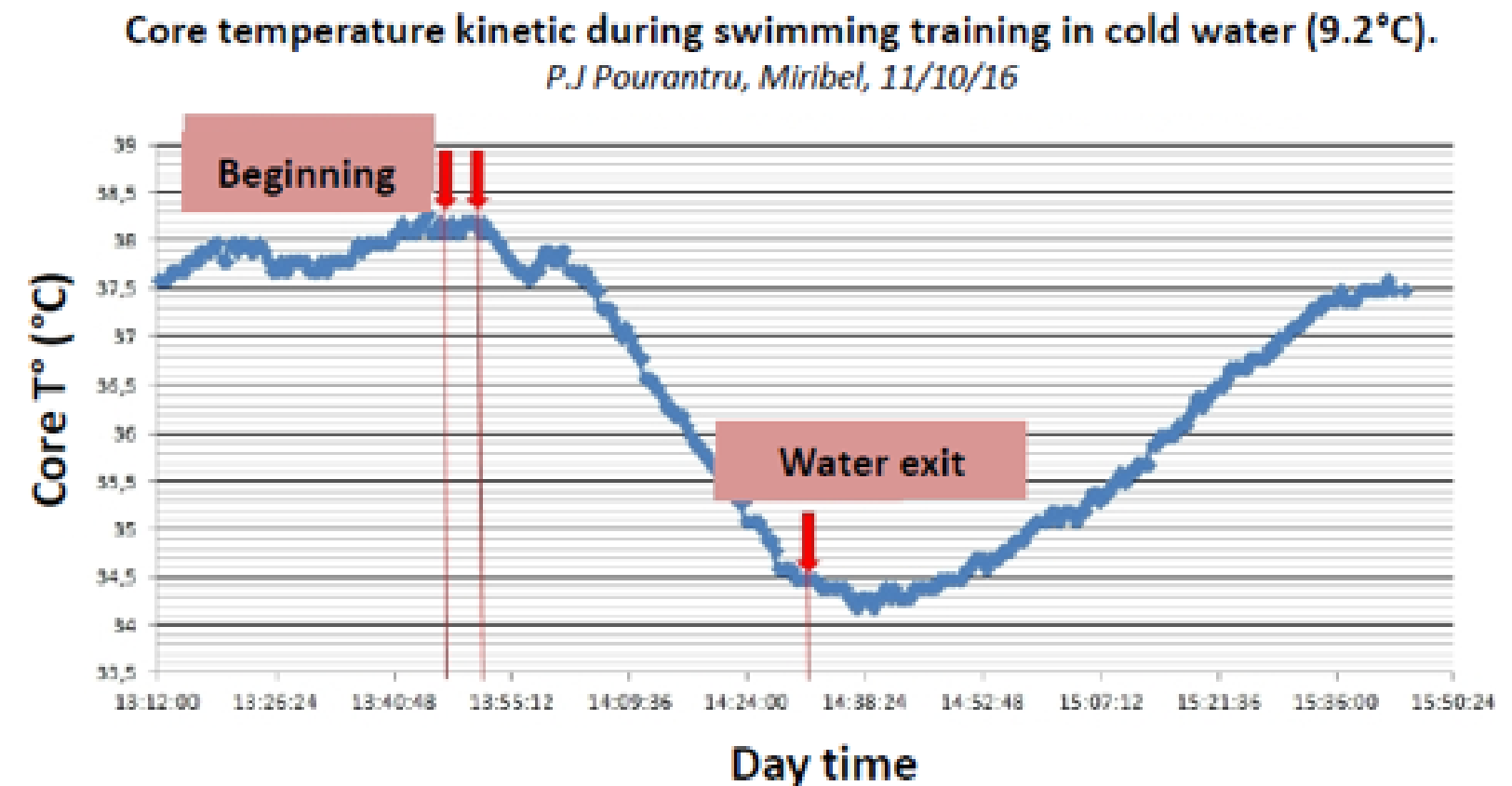
eCelsius® Performance ADDED VALUE

- 1 Health protection
- 2 Equipment assessment
- 3 Assessment of individual resistance to cold temperatures

The monitoring of core temperature in all harsh sport environments which are likely to involve thermal risks (Cold/heat/humidity), allow to study individual coping skills in critical environment.

Publications:

Melau et al., (2020), Impact of a 10km cold water swim on Norwegian Naval Special Forces recruits.
Deng et al., (2020), Effects of local heating on thermal comfort of standing people in extremely cold environments.



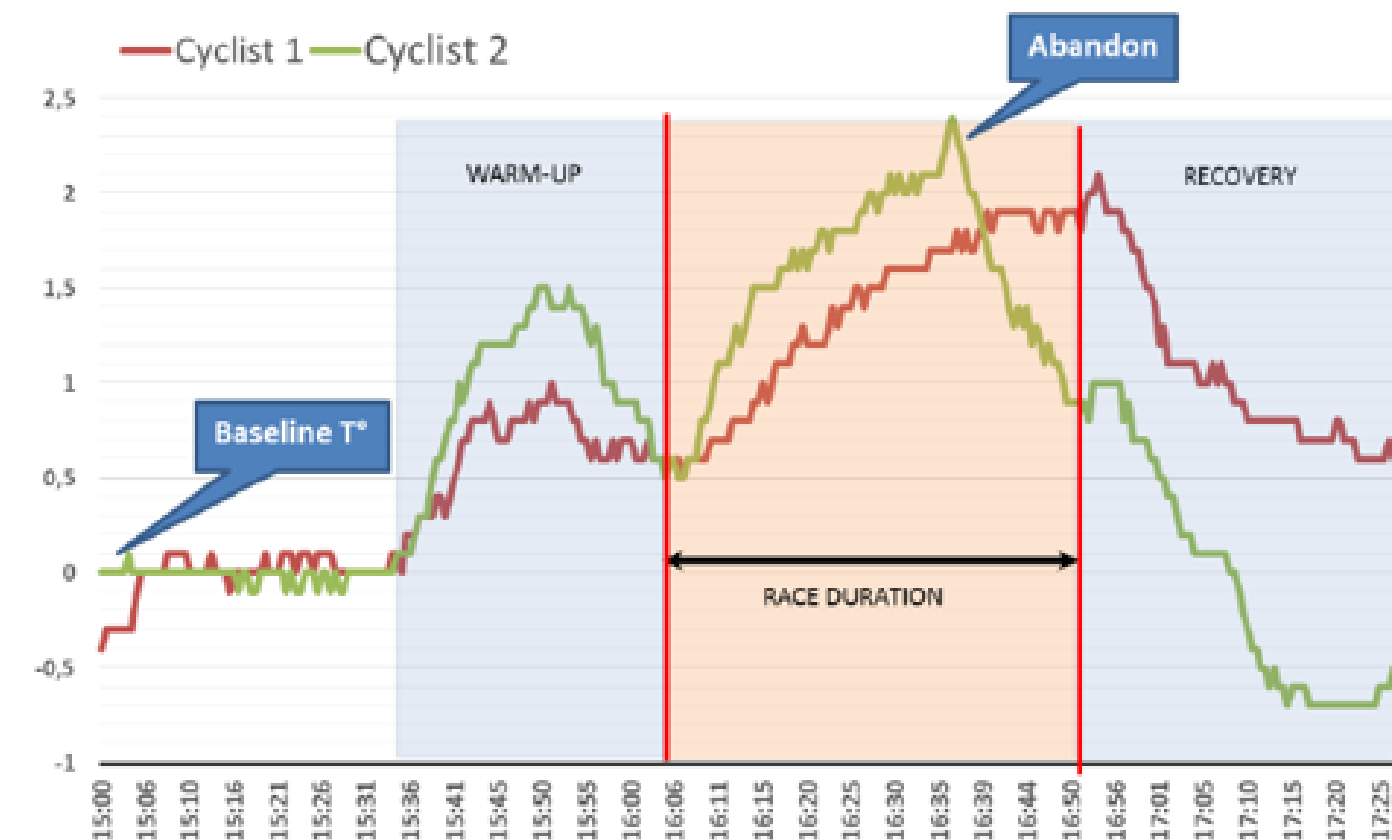
Example of research studies

Warm-up optimization

eCELSIUS PERFORMANCE ADDED VALUE

- 1 Warm-up process assessment
- 2 Individualization of warm-up
- 3 Performance optimization

Core temperature increasing during warm up process must be controlled. Limitation of core temperature rise during warm-up process allows to delay the discomfort and exhaustion associated to hyperthermia.



FDJ pro cycling team, Team Time Trial - World Road Cycling Championship, (Richmond 2015)

Publications:

Taylor et al., 2019, An ice vest limits the rise in core temperature during a Rugby Sevens warm-up.

Keller et al., 2020 Comparison of two different cooling systems in alleviating thermal and physiological strain during prolonged exercise in the heat.

Example of research studies

Circadian rhythm monitoring and characterization

eCelsius® Performance ADDED VALUE

- 1 Assessment of individual CBT rhythm
- 2 Individual jet lag resynchronization
- 3 Performance optimization

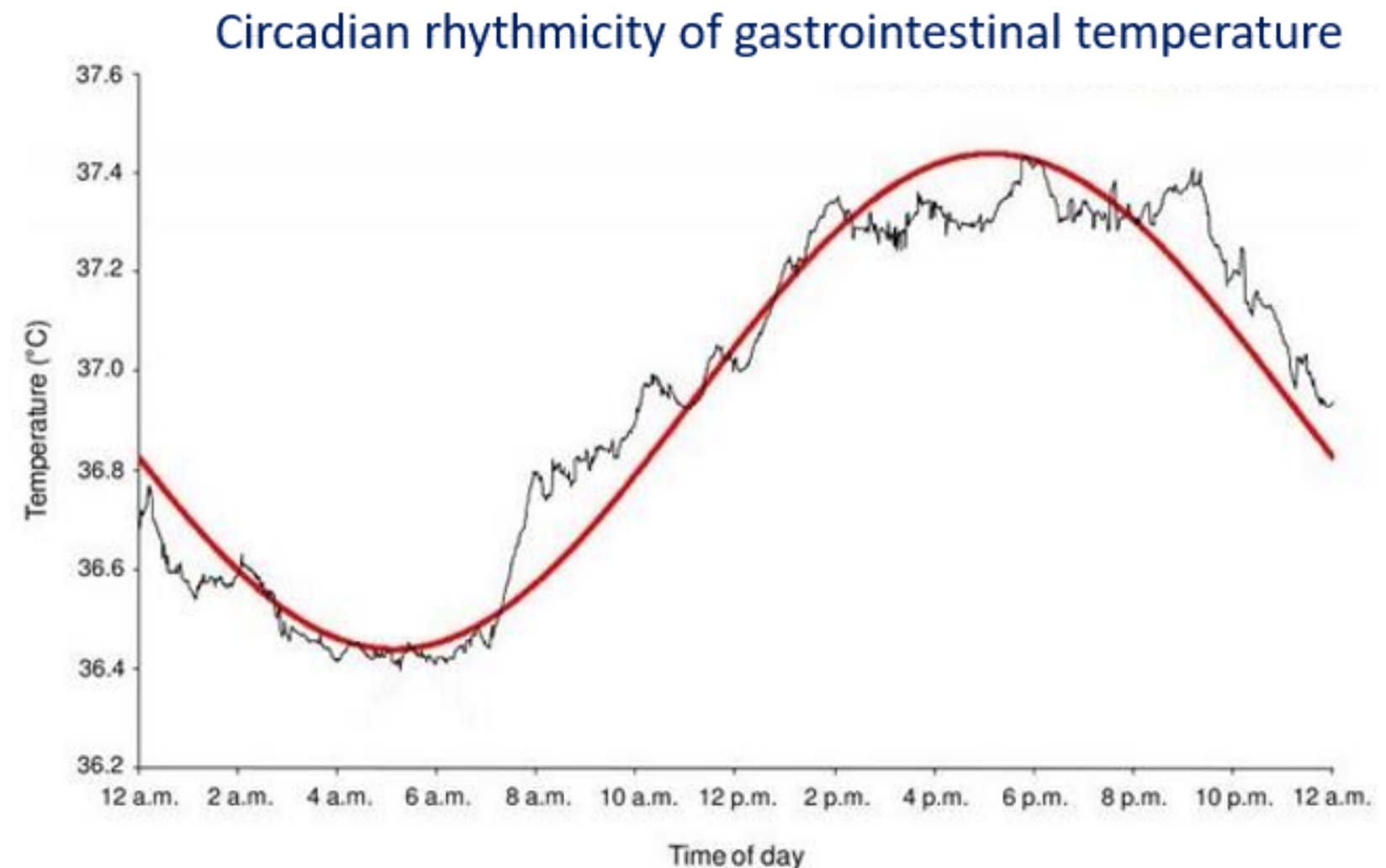
Circadian synchronization is of main importance for elite athletes. Core temperature is one of the main marker of the individual circadian rhythm. Circadian rhythm monitoring and characterization is a key element to optimize performance and recovery.

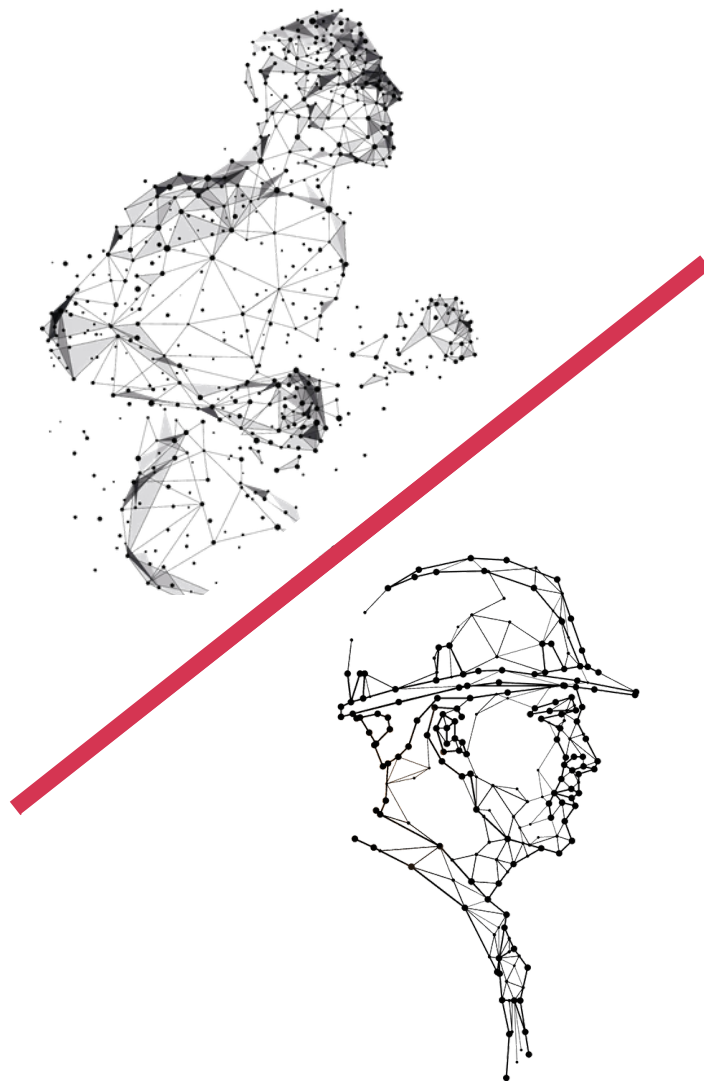
Publications:

Komarzynski et al., (2019), Predictability of individual circadian phase during daily routine for medical applications of circadian clocks.

De Blasiis et al., (2019) Photoperiod impact on a sailors =sleep wake rhythm and core body temperature in polar environment.

Dominiak et al., (2020), The effect of a short burst of exercise during the night on subsequent sleep.





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