

eCelsius Performance Connect brochure

A system for a reliable and accurate core body temperature data collection

Scientifically approved
Gold standard for core body temperature data collection

Summary

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Current fields of application

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About eCelsius Performance Connect

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eCelsius Performance Connect added value

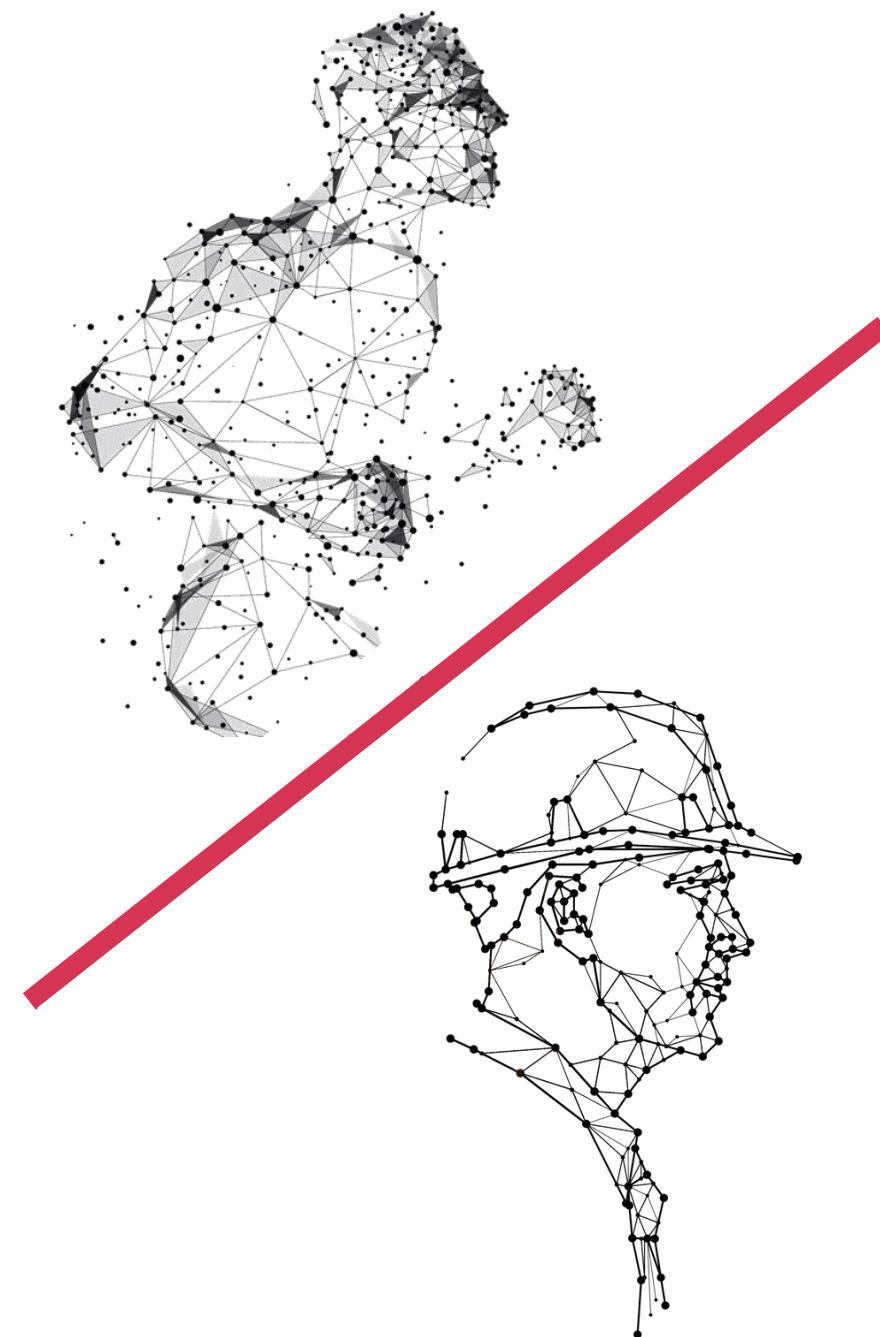
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Examples of research studies

slide 9-15

Current fields of application



Current fields of application

Few examples



SPORTS APPLICATIONS

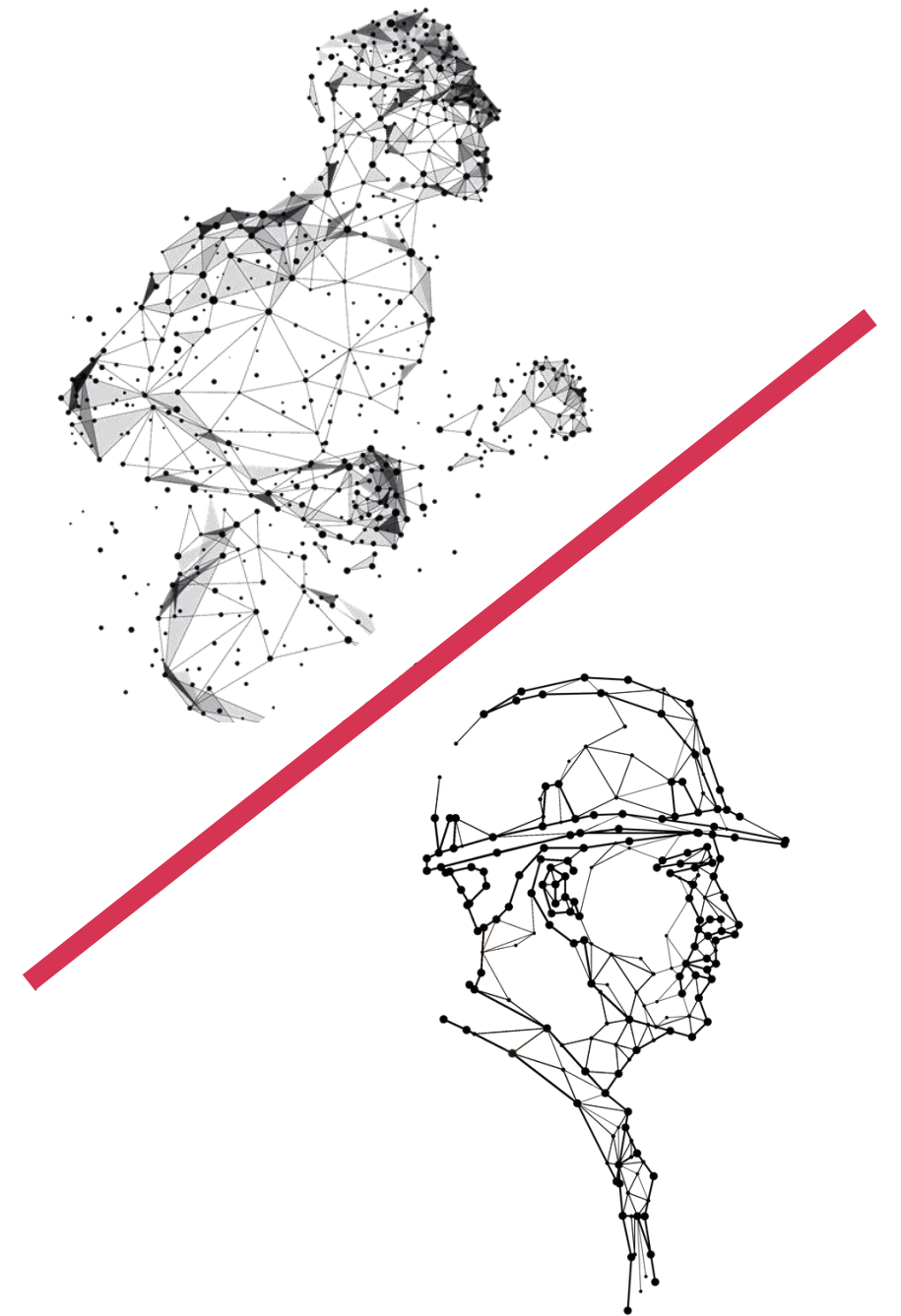
- Improve heat acclimatization process
- Improve performances in harsh environment
- Warm up – recovery process optimization
- Performances assessment/optimisation
- Quantifying and avoiding the Jet-Lag issue



APPLICATIONS FOR OCCUPATIONAL HEALTH RESEARCH

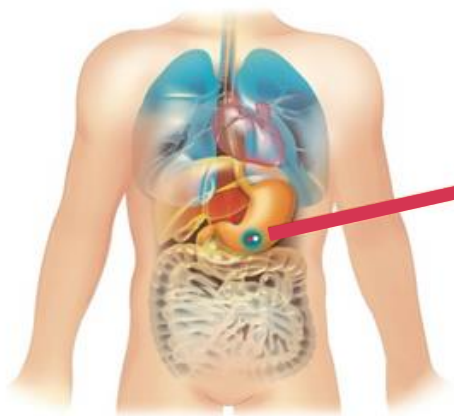
- Core body temperature data collection for soldiers
- Core body temperature data collection for fireman, rescue divers
- Improve physical & cognitive performances in harsh environment

About eCelsius Performance Connect



Introduction

eCelsius Performance Connect: the essentials



**eCelsius Performance
electronic capsule**

RF 433Mhz



ePerf Connect



**Activation box to turn on the
electronic capsule**



ePerf Mobile App

Communication range between electronic capsule and ePerf Connect in real time: around 1 m (depending on subject & environment)

About eCelsius Performance Connect

Specifications



eCelsius Performance electronic capsule SPECIFICATIONS

Electronic capsule cleaning	Standardized cleaning process
Size (diameter x length)	17.7mm x 8.9mm
Weight	1.7g
Temperature accuracy	+/- 0.1°C for subject physiological range 36-41°C, ±0.13°C outside of the physiological range.
Temperature resolution	0.01°C
Life duration	20 days
Shelf life	2 years
Measurement period available	15s, 30s, 1min, 2min, 5min
Temperature range	25° - 45°C (77 - 113°F)



eCelsius Perf Activator SPECIFICATIONS: to tun on the electronic capsule

Size	69mm x 59mm x 31mm
Able to activate a large number of electronic capsules	



ePerf Connect SPECIFICATIONS: to collect and record data

Size	52mm x 25mm x 15mm
Weight	33g
Number of electronic capsules associated	Up to 3
Storage	152 196 data per electronic capsule
Autonomy	2-5 days in function of the use-case
Water resistant	5 ATM



Minimum
weight 40kg



ePerf Mobile App:
To configure the ePerf
Connect device and
display the data
collected & recorded

For Android
Smartphone/Tablet
(Available on Google
Play Store)



Few parameters may impact the performance of the system:

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

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

eCelsius Performance Connect added value

Technical specifications:



ELECTRONIC CAPSULE INTERNAL MEMORY

Embedded memory in the electronic capsule allows to continuously store the last 2000 collected data in FIFO mode and independently of the electronic capsule life duration.



MEASUREMENT PERIOD

Several sampling frequencies are available and can be changed all along the data collection.



SIMPLE WAY OF WORKING

After activation and ingestion, the electronic capsule automatically collects and transmits accurate and reliable temperature data to the ePerf Connect watch.



ACCURATE DATA

eCelsius Performance guarantees you an accuracy of +/- 0.1°C, for subject physiological range 36-41°C, ±0.13°C outside of the physiological range.

Other:



ADD MARKERS

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



LIGHTWEIGHT & TINY

Electronic capsule is lightweight 1.7g and measures 17.7mm x 8.9mm.



DESIGNED FOR SUBJECT

Designed only for 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 ePerf Connect is in the communication range of the capsule, you can collect real time data. If not, ePerf Connect will synchronize the missing data as soon as the electronic capsule and ePerf Connect device are back in their communication range.



ADAPTABLE DATA COLLECTION

During the data collection, you have the possibility to change the measurement period at any time. In addition to the internal memory, the several sampling frequencies available, allows the system to fit with your protocol.



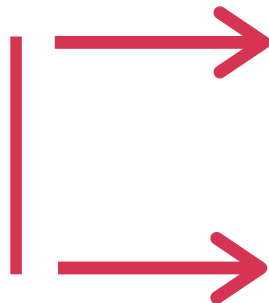
TIME SAVER

Save time thanks to quick and easy implementation. Full data set available on site through an Android mobile App.

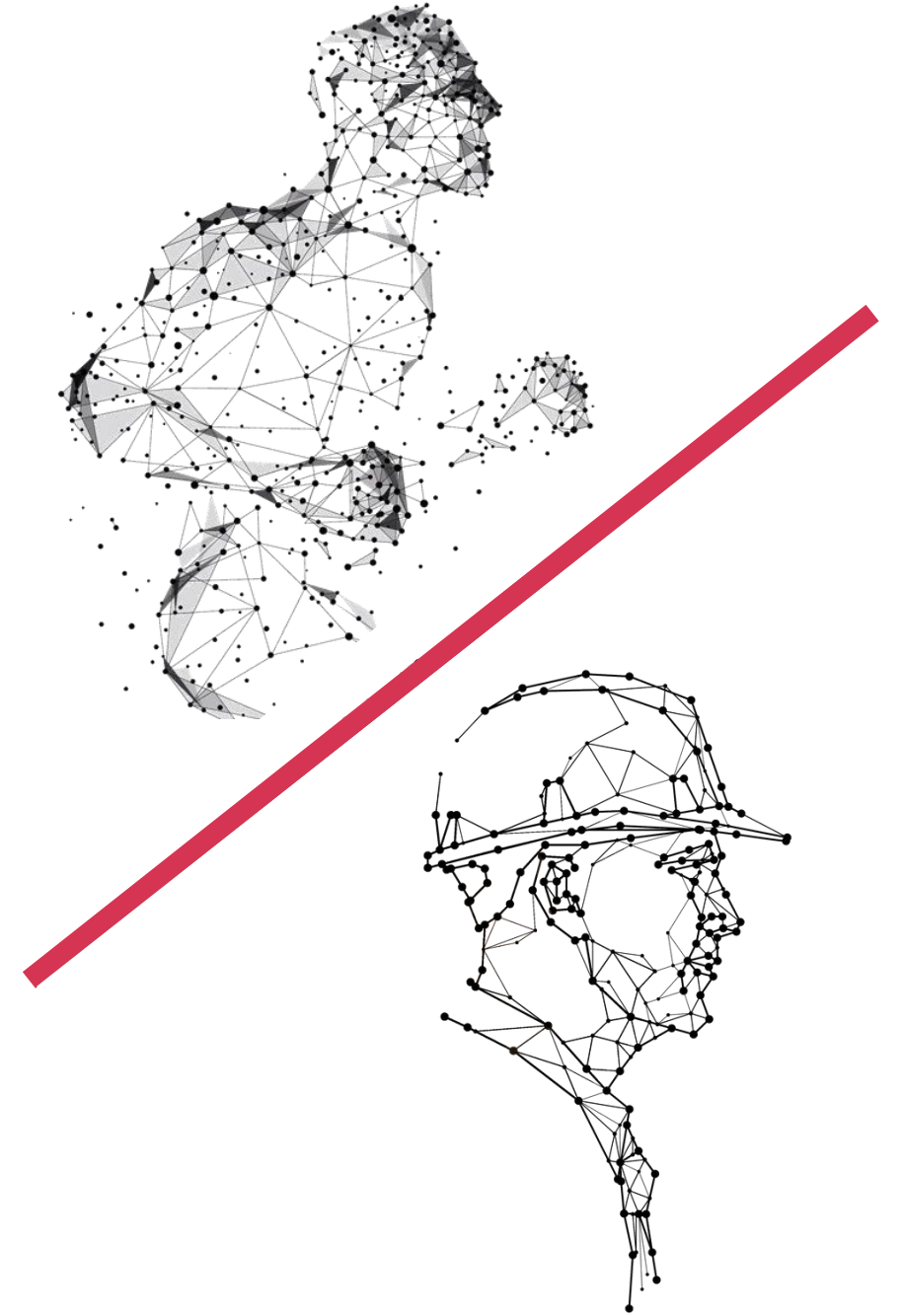


RELIABLE MONITORING

Accurate data with a resolution of 2 digits.



Examples of research studies



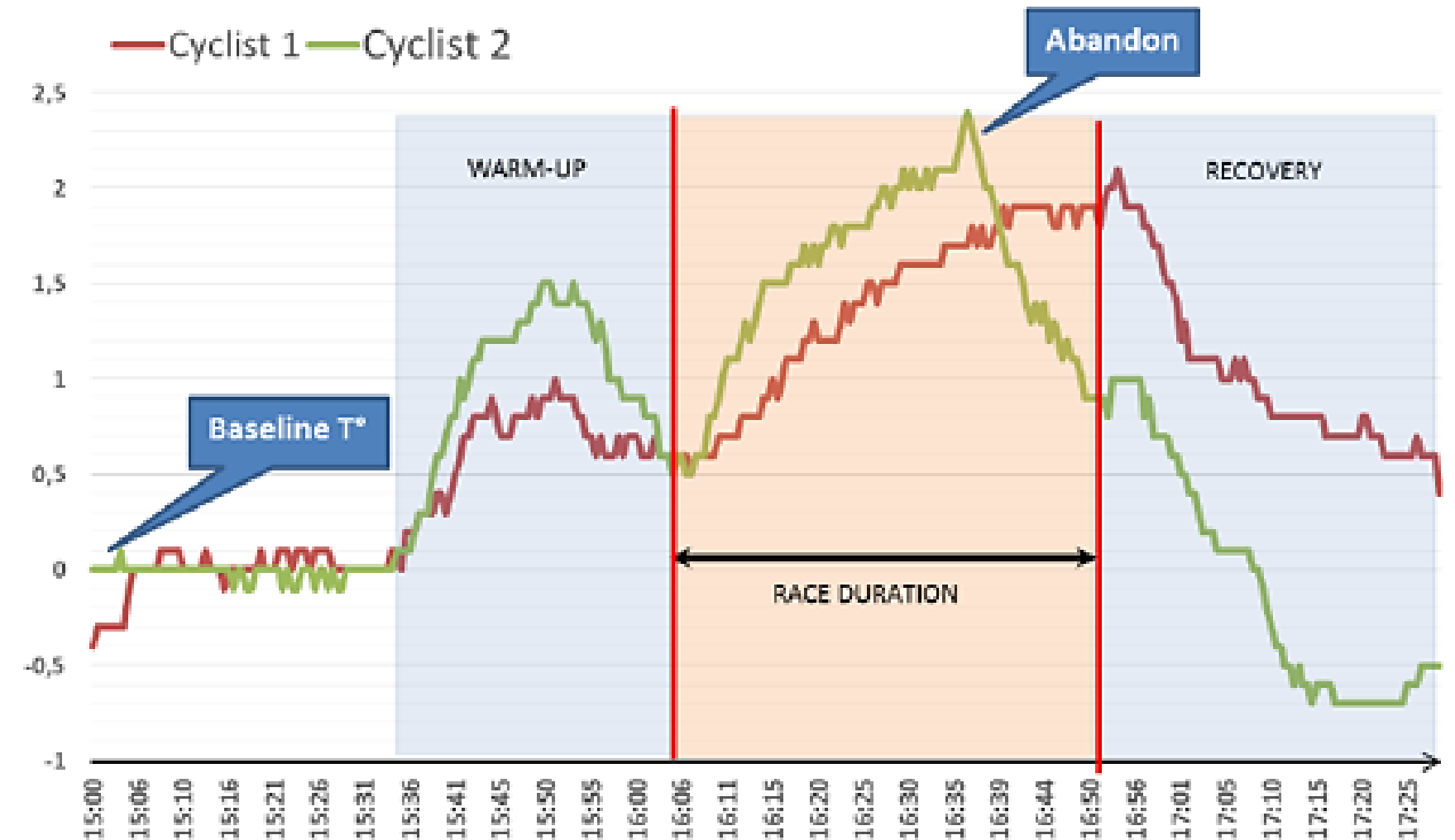
Examples of research studies

Sport / research purpose

eCelsius Performance Connect ADDED VALUE

- 1 Continuous core temperature control
- 2 Support performances improvement in harsh environment
- 3 Equipment, training/recovery processes assessment

Long duration exercises performed in the heat induce rise in core body temperature.



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

Publications:

Xu et al., 2021, Effects of Hot and Humid Environments on Thermoregulation and Aerobic Endurance Capacity of Laser Sailors.

Racinais et al., 2022, Association between thermal responses, medical events, performance, heat acclimation and health status in male and female elite athletes during the 2019 Doha World Athletics Championship.

Aylwin et al., 2023, Thermoregulatory responses during road races in hot-humid conditions at the 2019 Athletics World Championships.

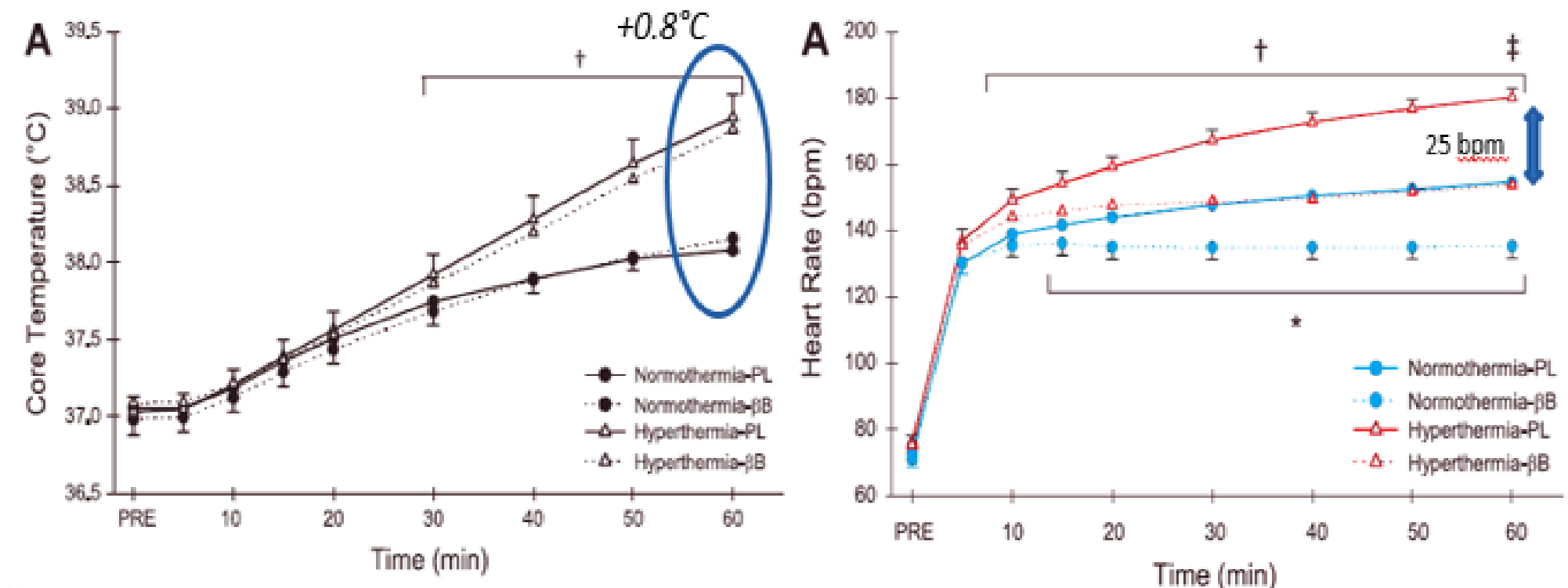
Examples of research studies

Performance optimization

eCelsius Performance Connect ADDED VALUE

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

The increase of core body temperature is directly correlated to performances decline. This can be avoided with an individual acclimatization program.



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

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

Publications:

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

Roussey et al., 2021, Heat acclimation training with intermittent and self-regulated intensity may be used as an alternative to traditional steady state and power-regulated intensity in endurance cyclists.

Galan-Lopez et al., 2023, Heat Preparation and Knowledge at the World Athletics Race Walking Team Championships Muscat 2022.

Examples of research studies

Assessment of thermoregulation efficiency

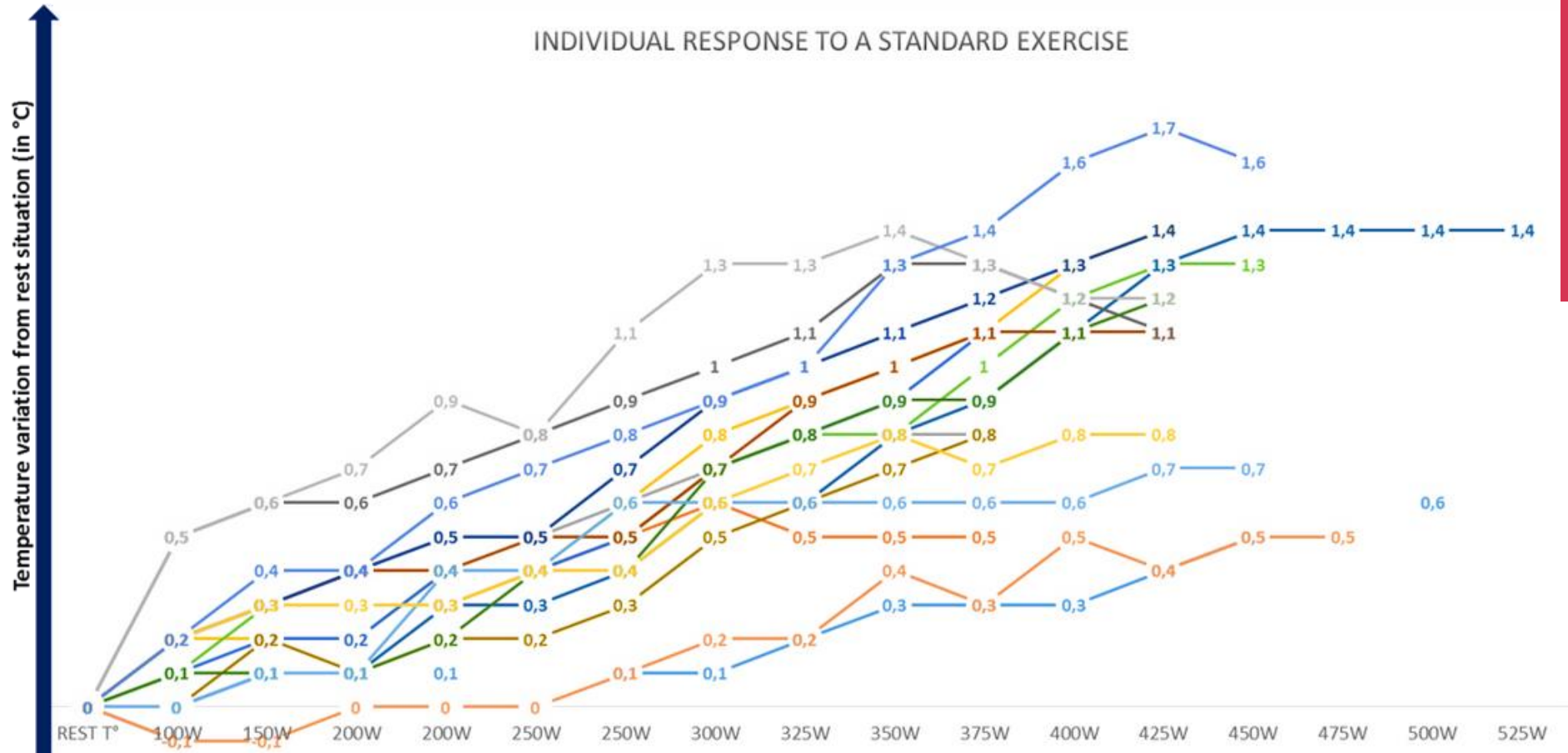
eCelsius Performance Connect ADDED VALUE

- 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 response.

Publications:

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.
Grossmann et al., 2022, Fluid Balance and Thermoregulatory Responses during Wheelchair Basketball Games in Hot vs. Temperate Conditions.



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

Examples of research studies

Cope with harsh environment

eCelsius Performance Connect ADDED VALUE

- 1 Improve performances in harsh environment
- 2 Equipment assessment
- 3 Assessment of individual resistance to cold temperatures

Core body temperature data collection in all harsh environments (Cold/heat/humidity) allow to assess individual ability to cope with these conditions and therefore avoid thermal risks or a drop in performances.

Publications:

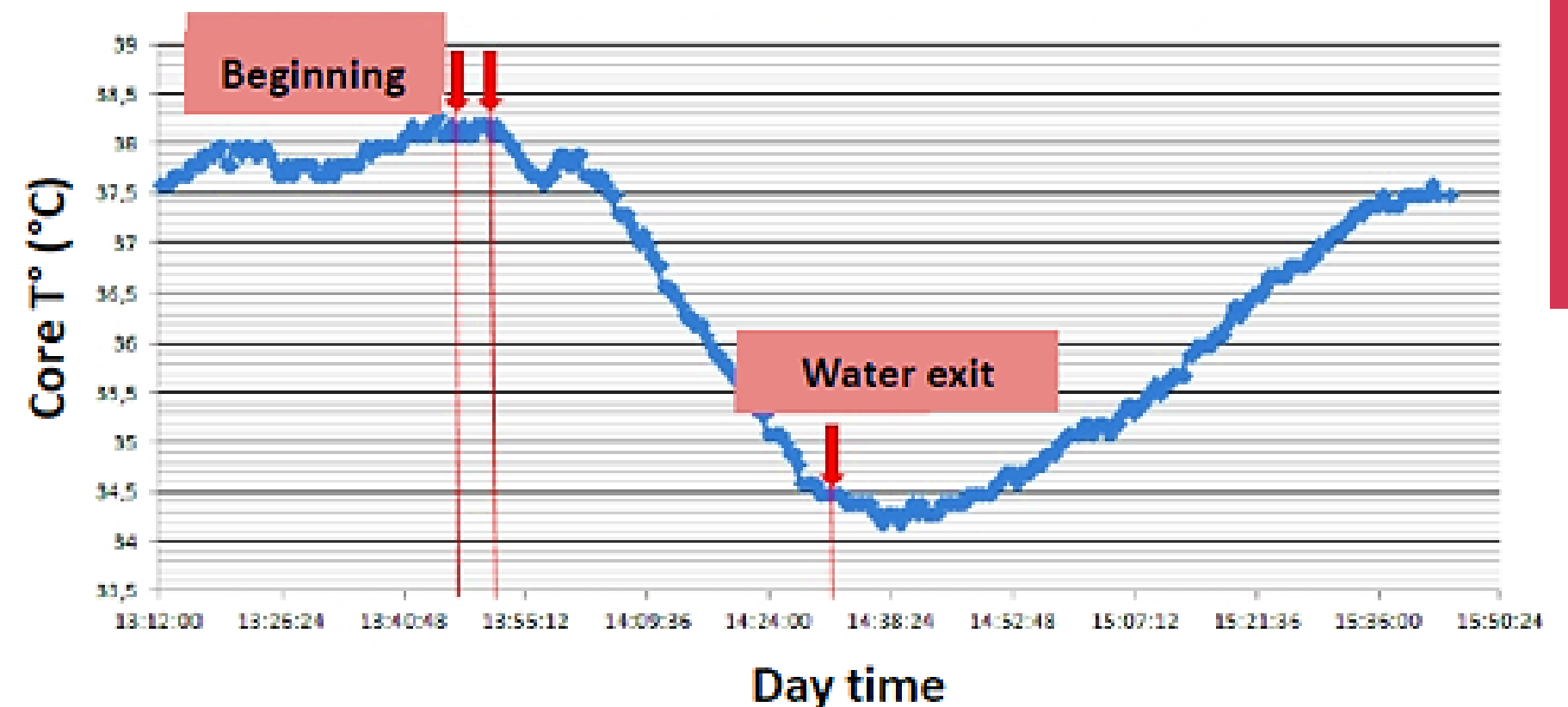
Deng et al., 2020, Effects of local heating on thermal comfort of standing people in extremely cold environments.

Melau et al., 2022, Physiological changes following swimming in cold water in triathlon and military operations.

Cartwright et al., 2022, Duration limits for exposure for the whole body and extremities with a military extreme cold protection clothing ensemble at an ambient temperature of -40°C.

Core temperature kinetic during swimming training in cold water (9.2°C).

P.J Pourantru, Miribel, 11/10/16



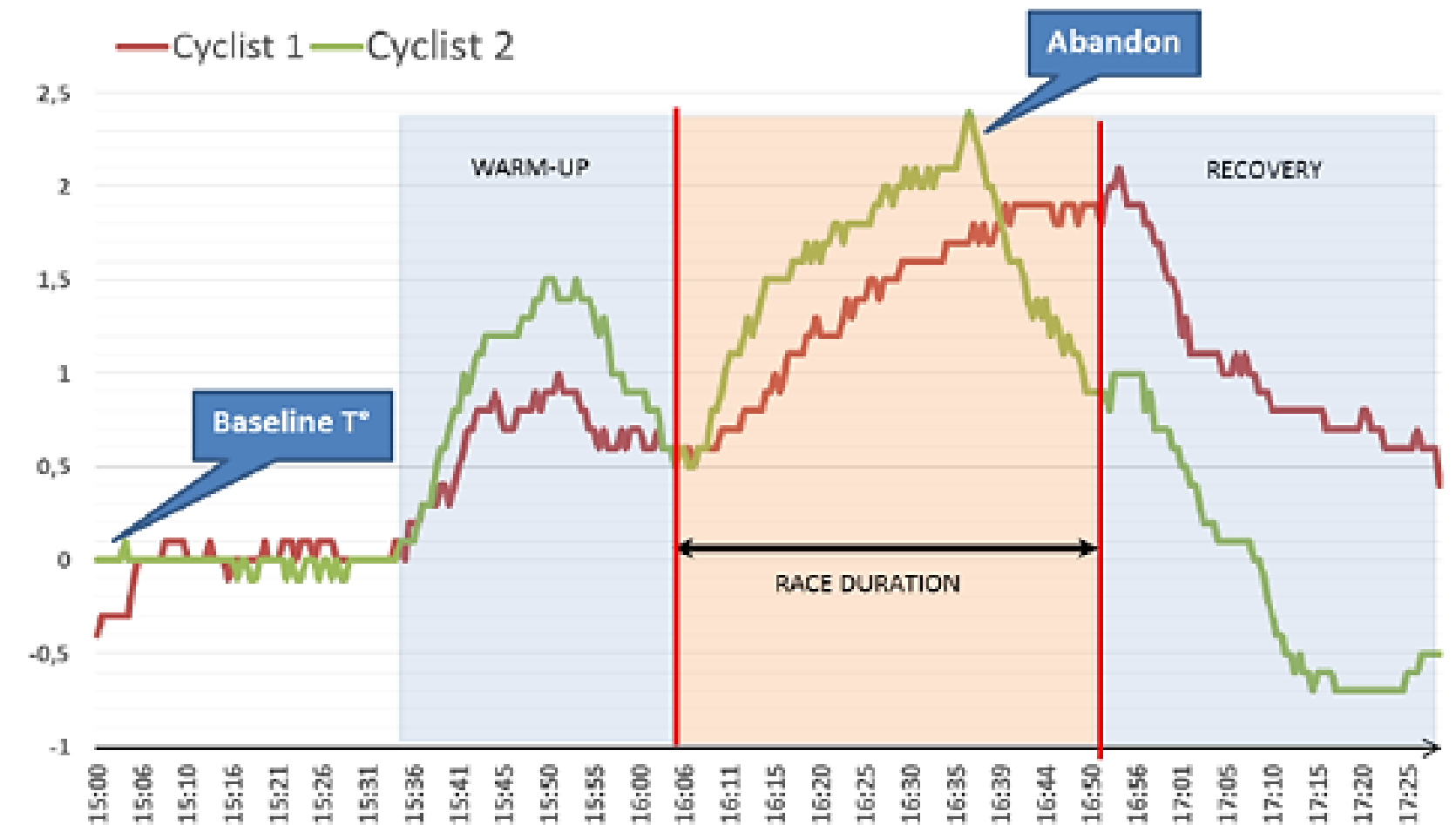
Examples of research studies

Warm-up optimization

eCelsius Performance Connect ADDED VALUE

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

Core temperature increasing during warm up process has to be controlled. Limitation of core body temperature rise during warm up process allows to delay the discomfort and exhaustion associated to an abnormally high core body temperature.



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

Publications:

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

Moussalem et al., 2021, Effect of Phase Change Material Cooling Vests on Body Thermoregulation and Thermal Comfort of Patients With Paraplegia
A Human Subject Experimental Study.

Racinais et al. 2021, Hydration and cooling in elite athletes' relationship with performance body mass loss and body temperatures during the Doha 2019 IAAF World Athletics.

Examples of research studies

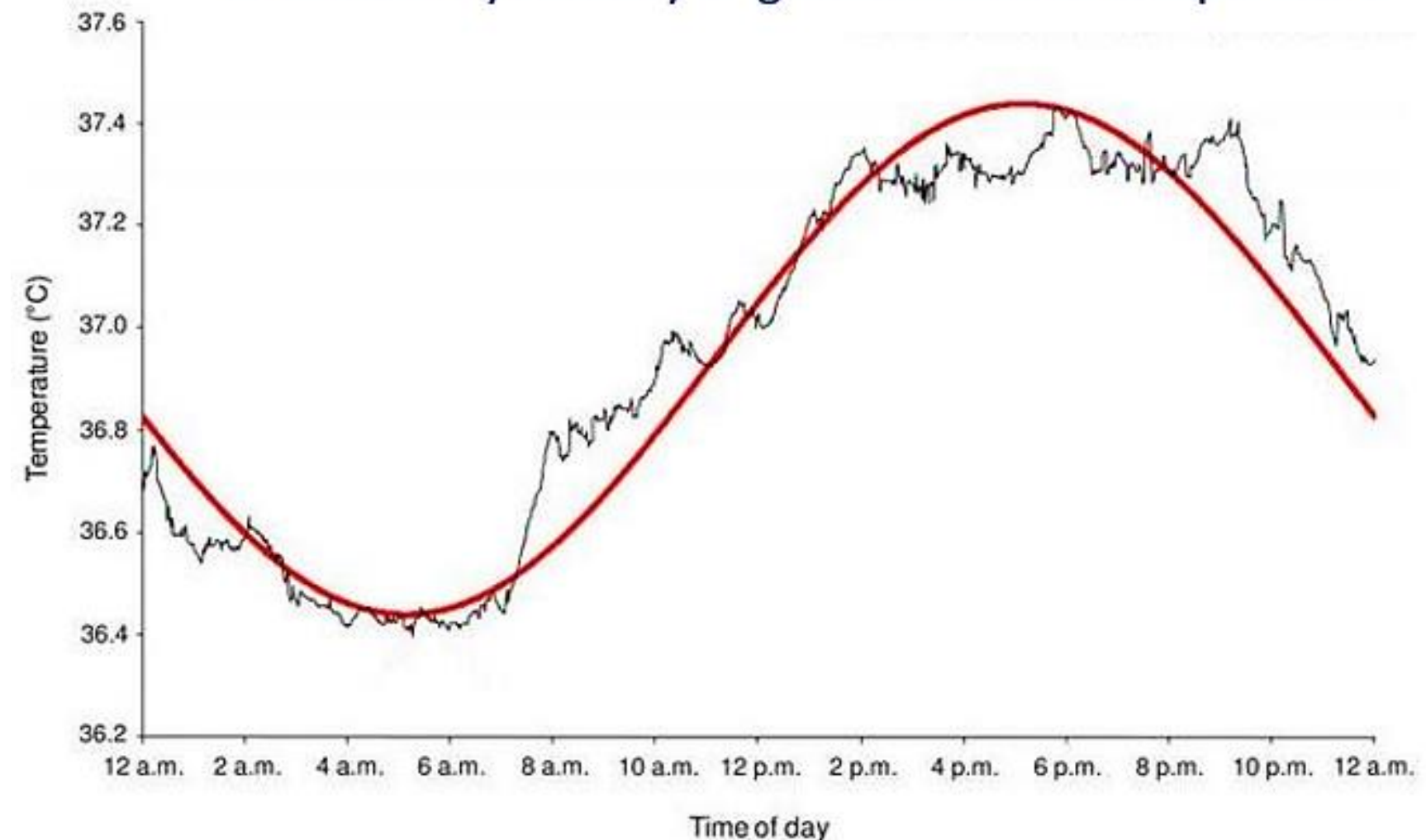
Circadian rhythm & characterization

eCelsius Performance Connect 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. Core body temperature circadian rhythm characterization is a key element to optimize performance and recovery.

Circadian rhythmicity of gastrointestinal temperature

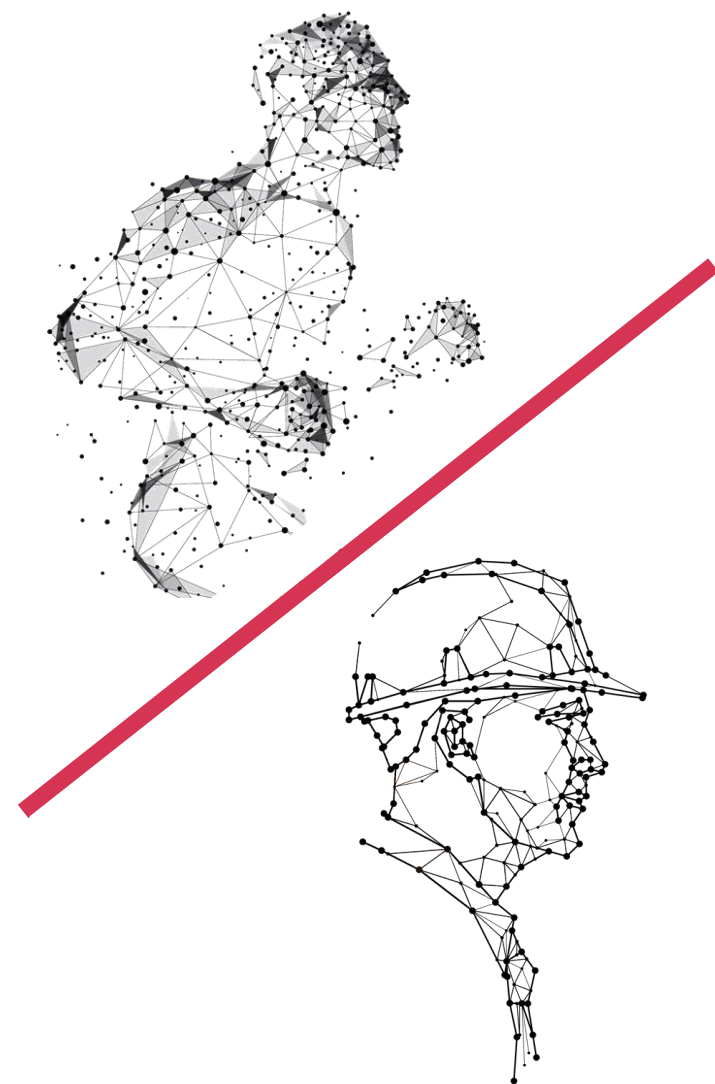


Publications:

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.

Hou et al., 2022, Diurnal Circadian Lighting Accumulation Model A Predictor of the Human Circadian Phase Shift Phenotype.



Reach Out to Us

Email address

support@bodycap.io

Mailing address

BodyCAP
3 rue du Docteur Laennec
14200 Hérouville Saint-Clair
FRANCE

Phone number

+33 (2) 61 53 08 14

Follow us on social media

