

**THERMOREGULATION
AND SYMPATHETIC
NERVOUS SYSTEM**

Seriously impaired thermoregulation

45

Death

Heat stroke

40

Hard exercise, fever

Effective thermoregulation

35

**Normal body temperature
(36,3 – 37,1°C)**

Impaired thermoregulation

30

Loss of consciousness

Cessation of thermoregulation

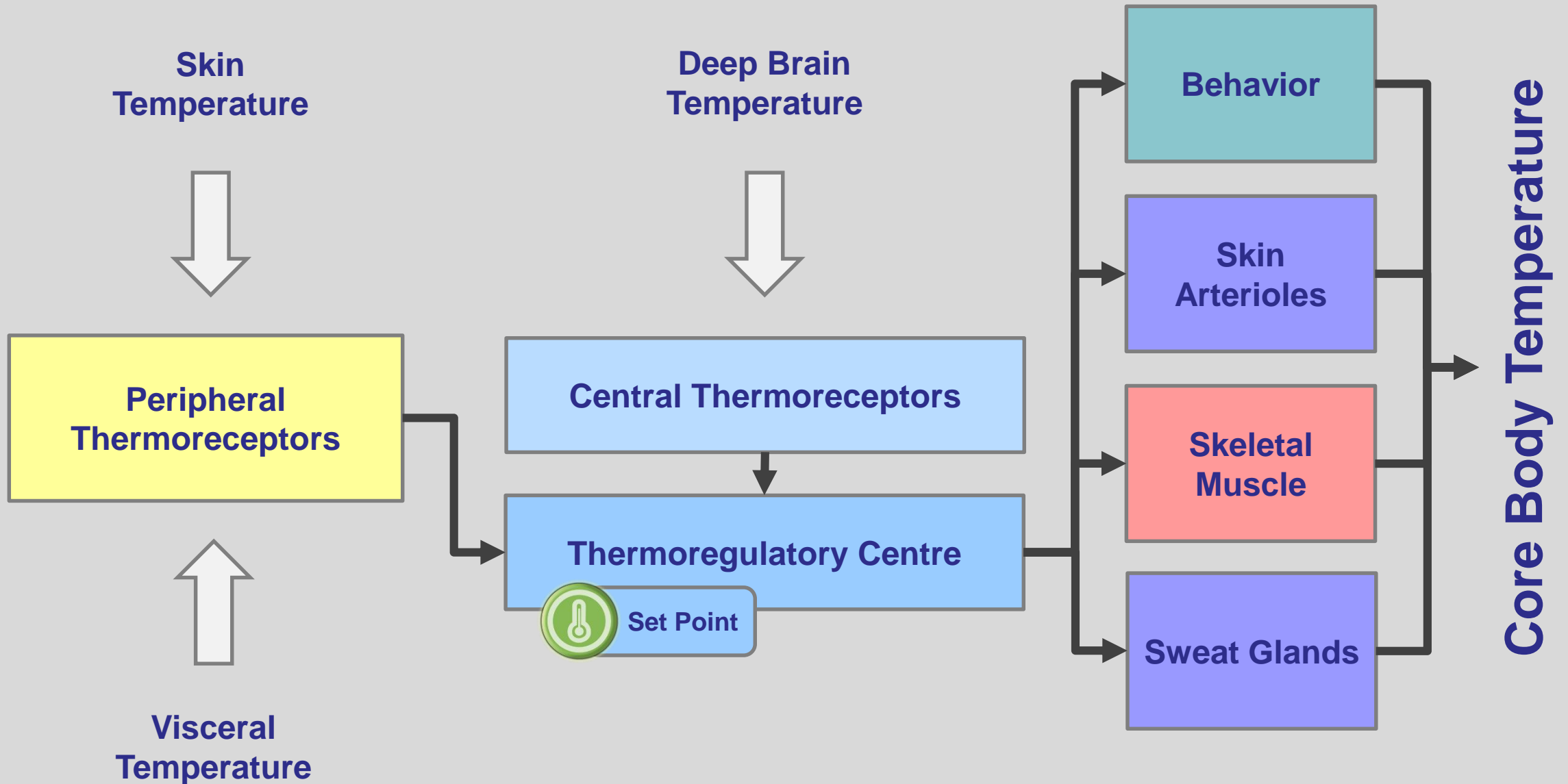
25

Cardiac arrhythmias

HYPERTHERMIA

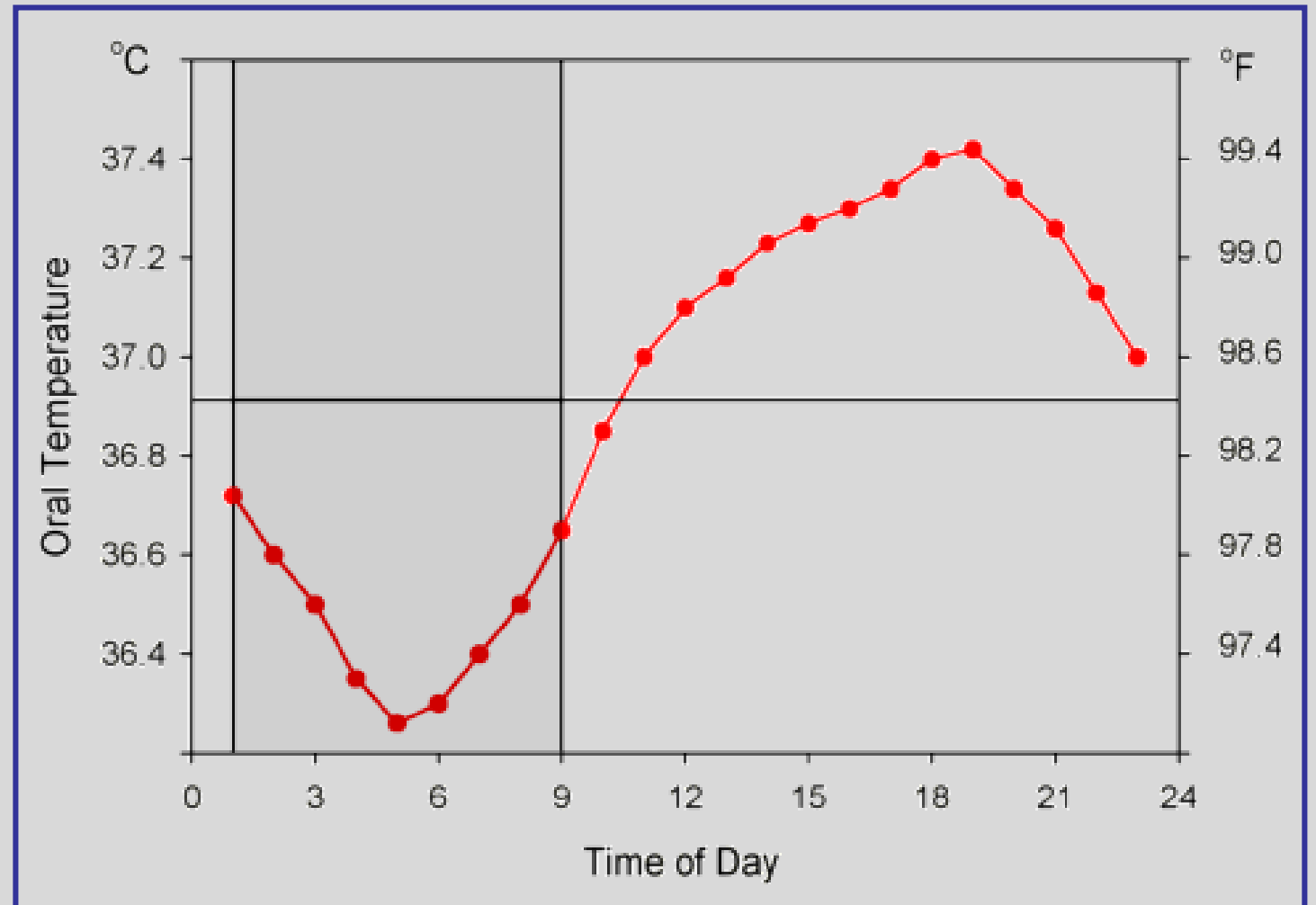
HYPOTHERMIA

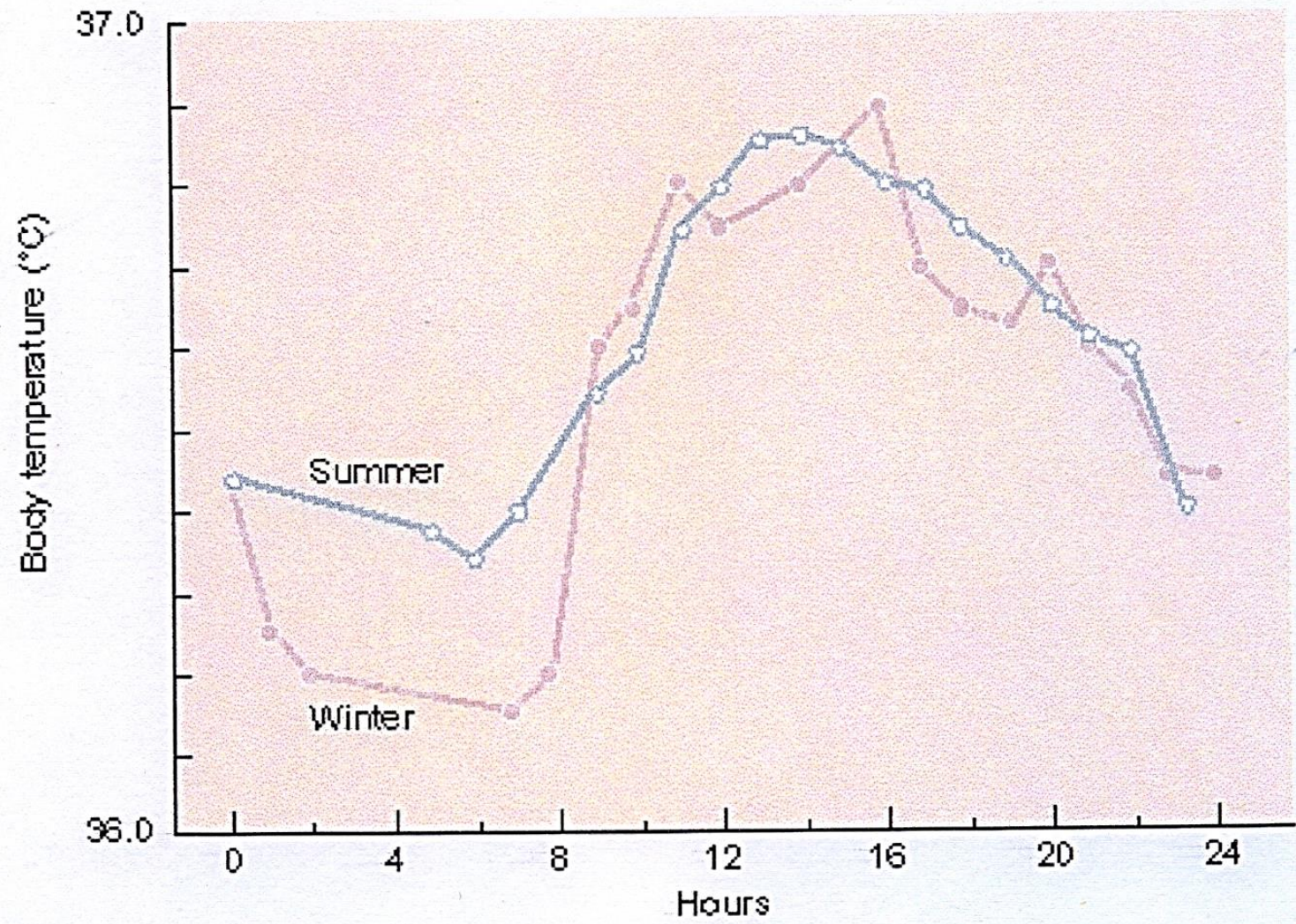
Ambient Temperature



Variations of core body temperature

- Circadian rhythm
- Menstrual cycle (circamensal rhythm)
- Seasonal variations (circannual rhythm)
- Ageing

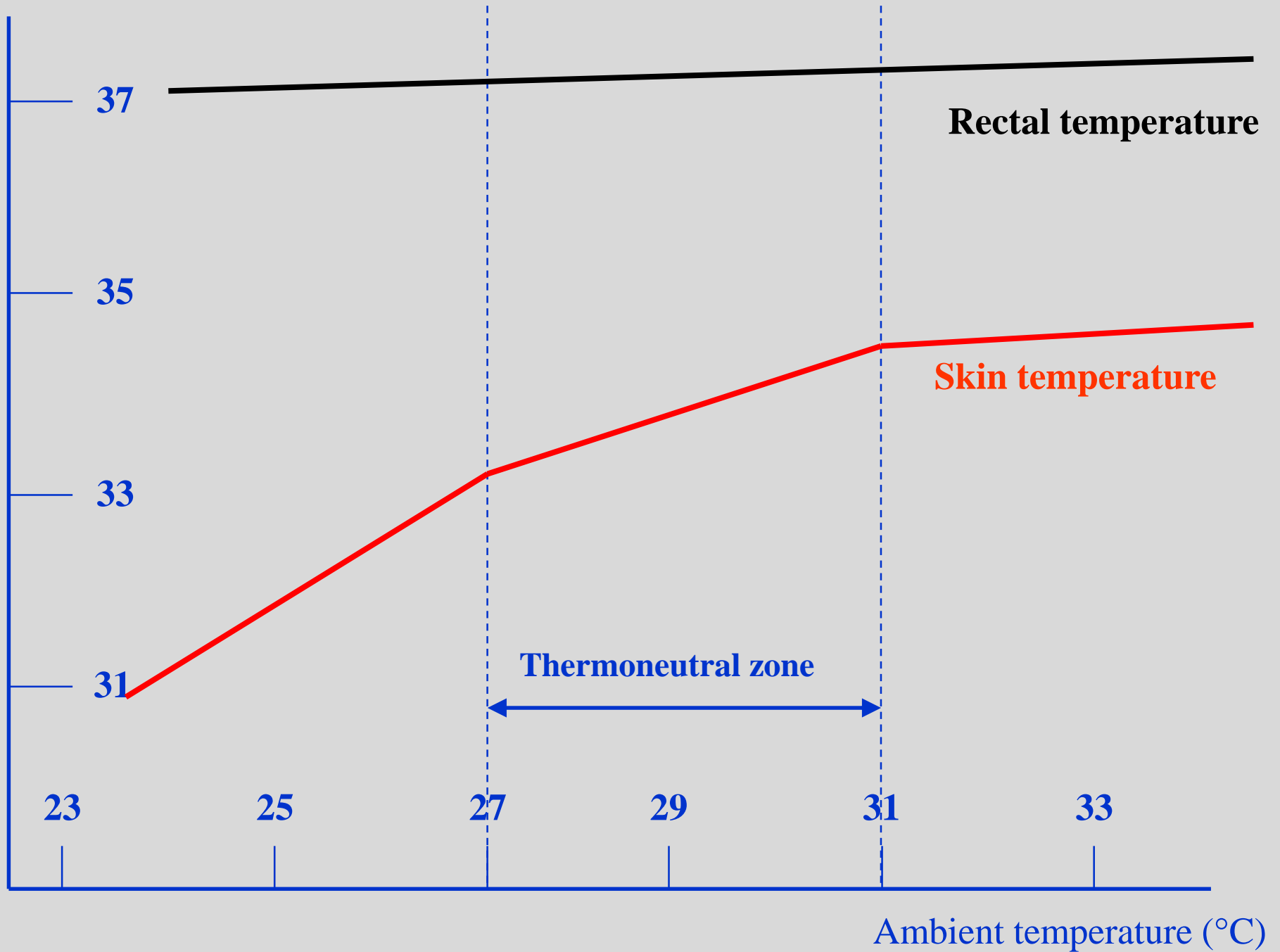




Body temperature measurement



Body temperature (°C)



Rectal temperature

Skin temperature

Thermoneutral zone

Ambient temperature (°C)

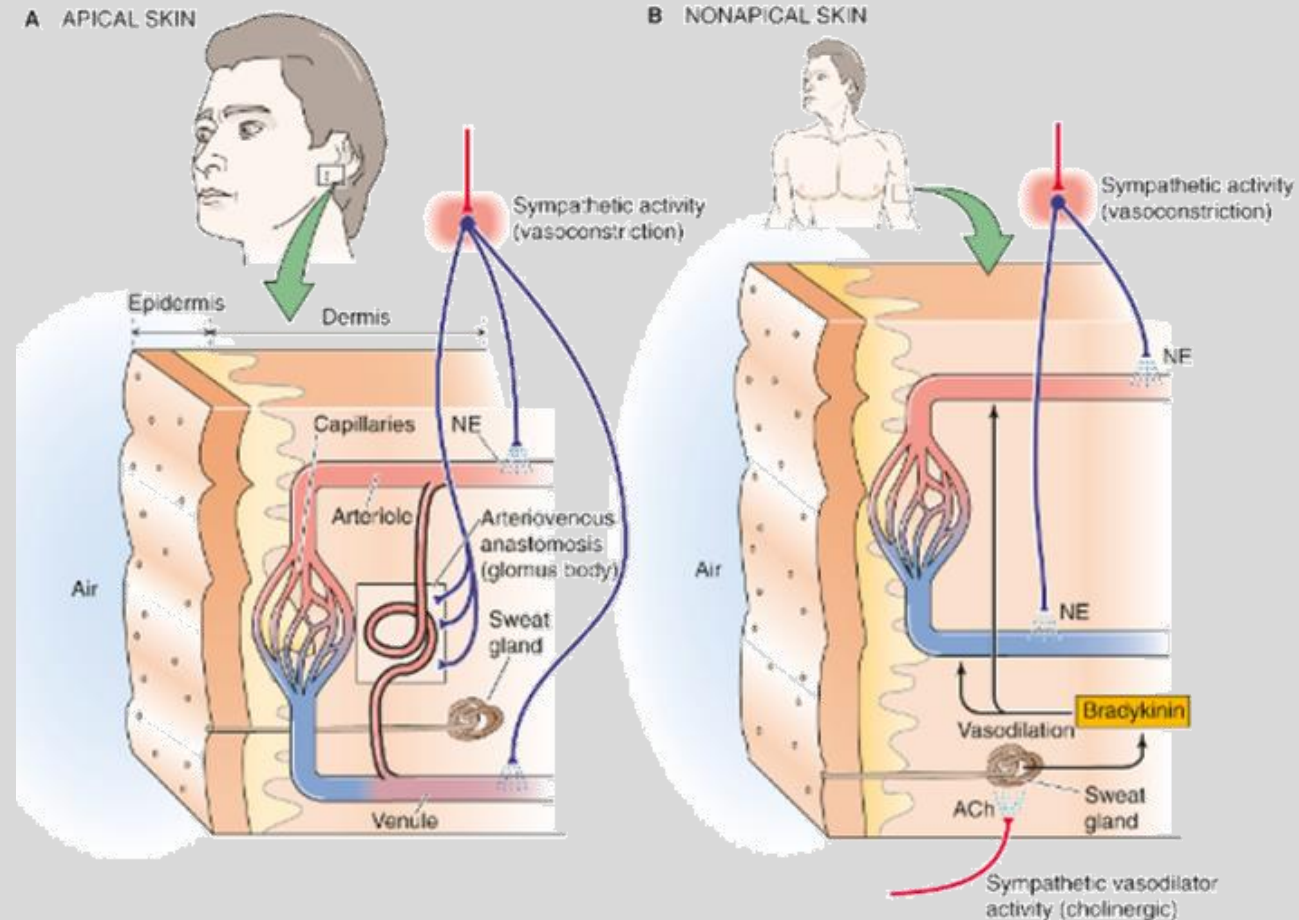
Skin blood flow control

- Apical skin

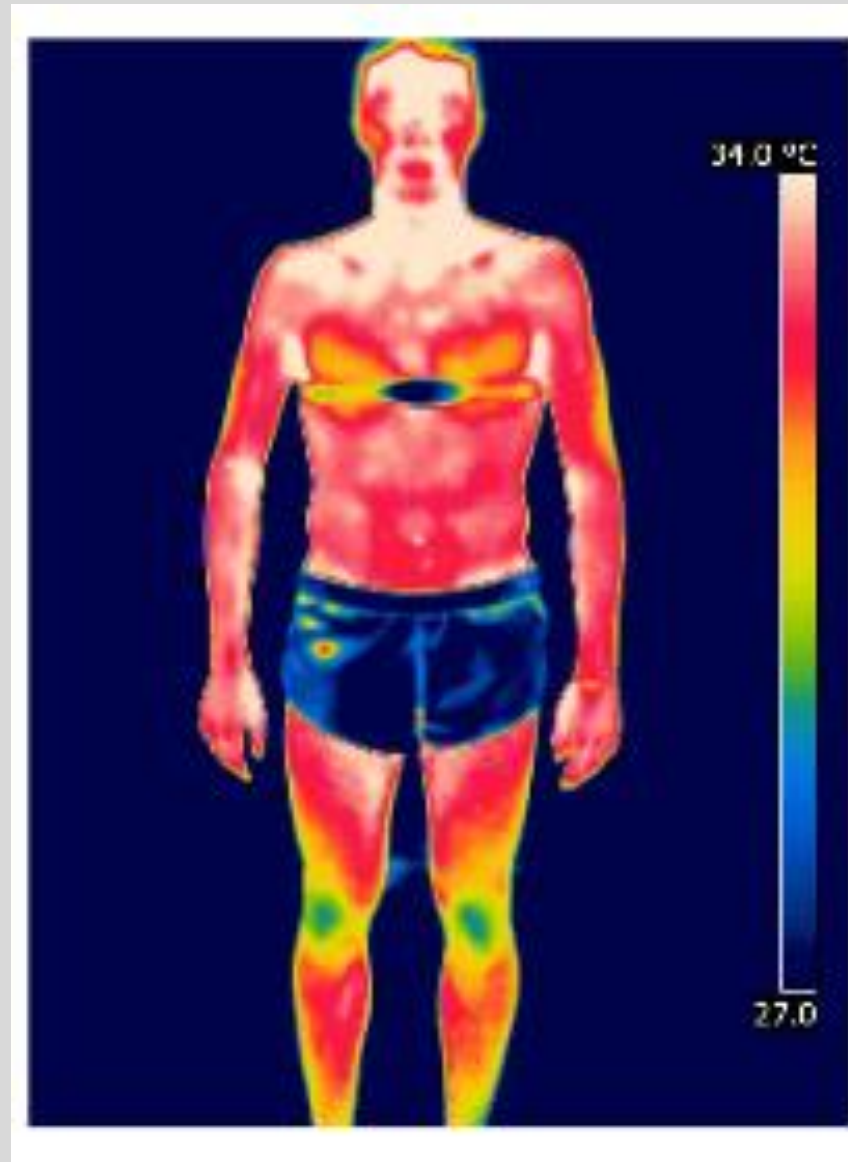
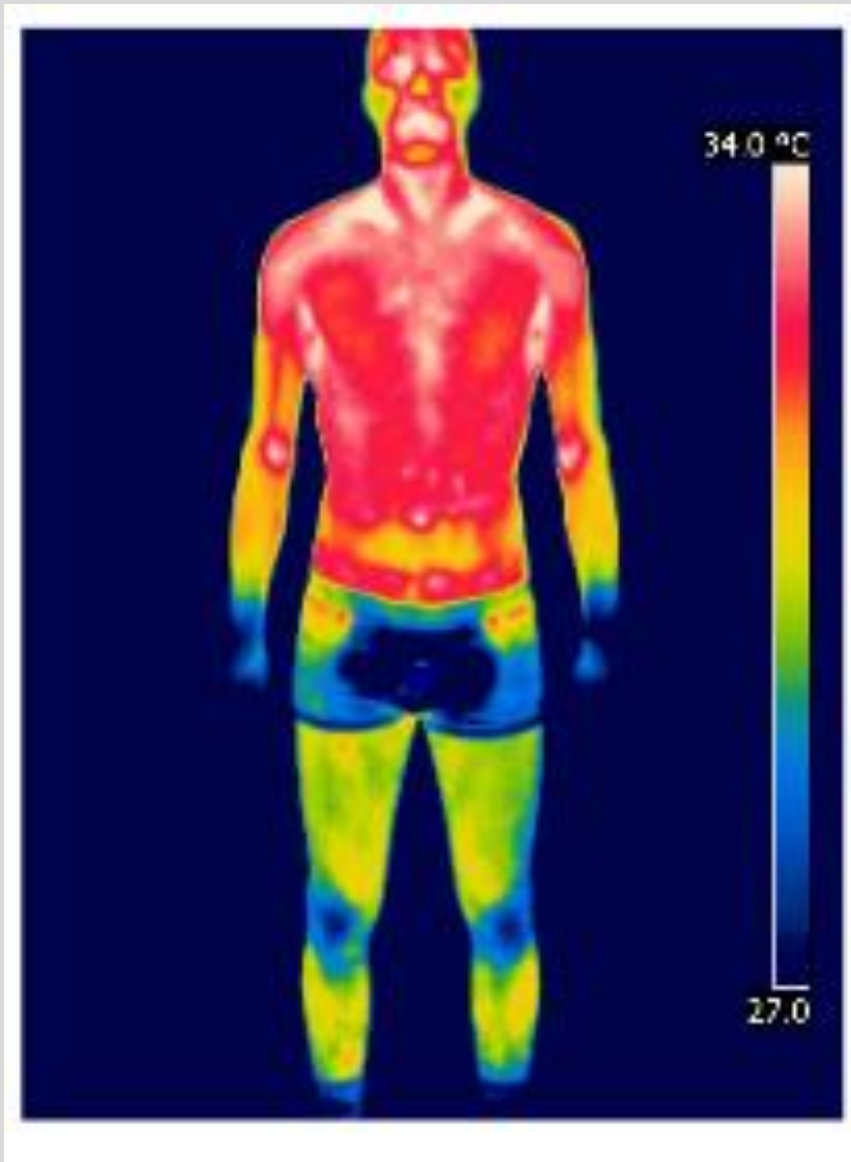
- a-v anastomoses
- Vasoconstriction: Sympath (NA- α 1)
- Vasodilation: pasive

- Non-apical skin

- Vasoconstriction: Sympath (NA- α 1)
- Vasodilation: Sympath (Ach-?)



Infrared Thermography

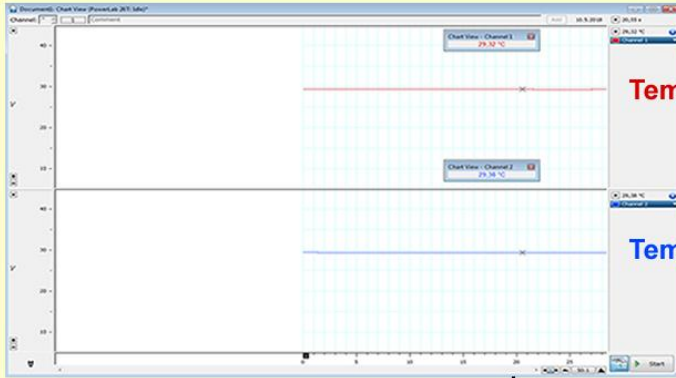


Infrared thermal images of the anterior body for two athletes

Adopted from:
Journal of Physics: Conference Series
655 (2015) 012062
doi:10.1088/1742-6596/655/1/012062

TEMPERATURE MEASURING SETUP

Task 1



Temp. sensor 1

Temp. sensor 2



Box with ice

Right arm

Temp. sensor 2

Temp. sensor 1

PowerLab system

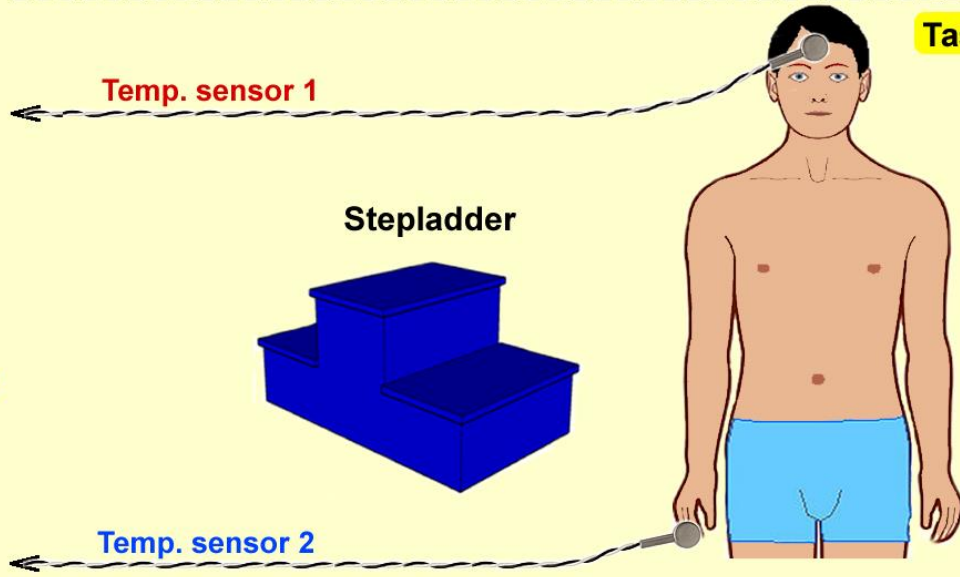


Temp. transducer 1



Temp. transducer 2

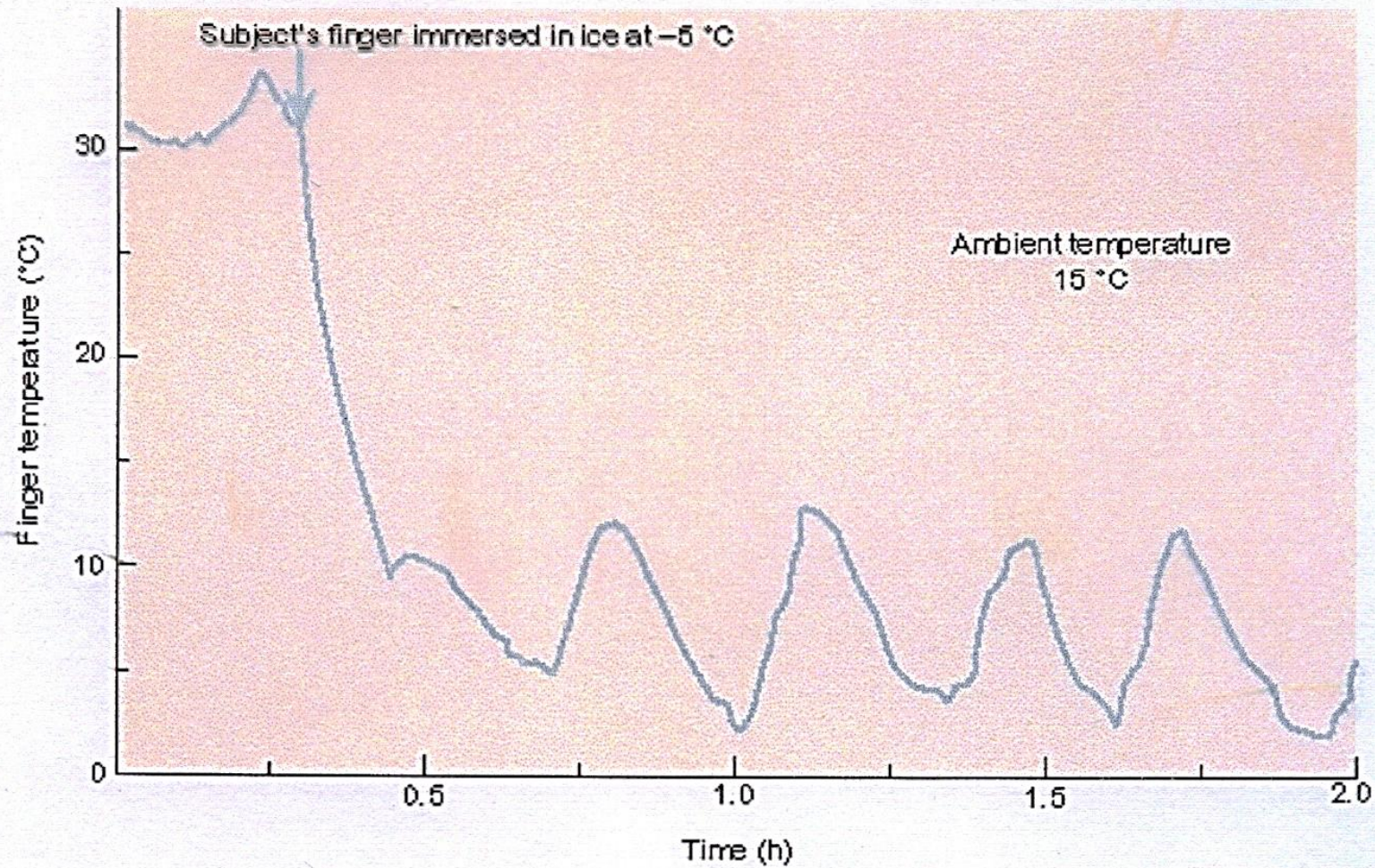
Task 2



Temp. sensor 1

Temp. sensor 2

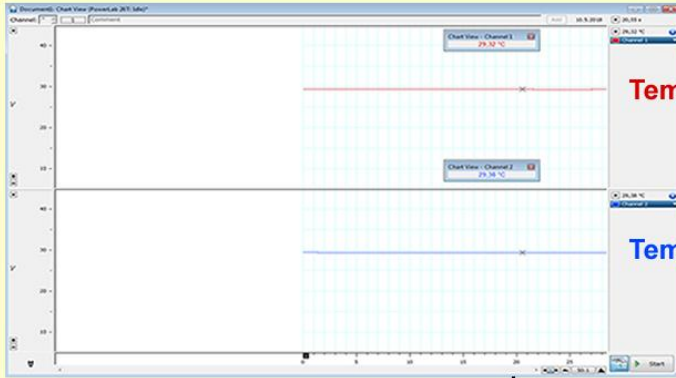
Stepladder



Lewis (1930):
„hunting reaction“

TEMPERATURE MEASURING SETUP

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Temp. sensor 2



Box with ice

Right arm

Temp. sensor 2

Temp. sensor 1

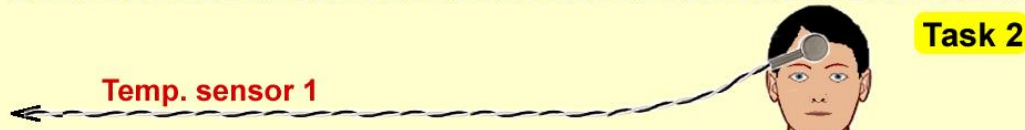
PowerLab system



Temp. transducer 1

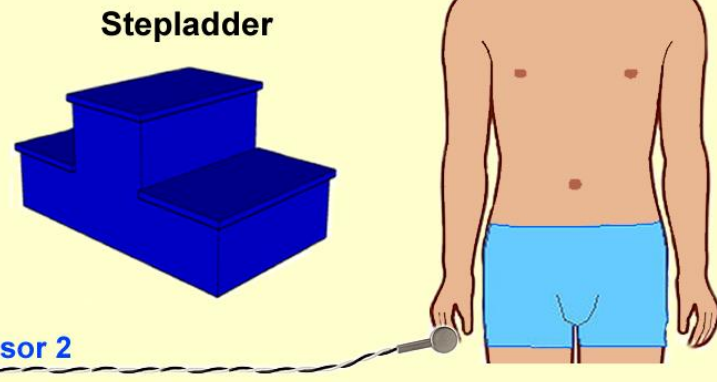


Temp. transducer 2



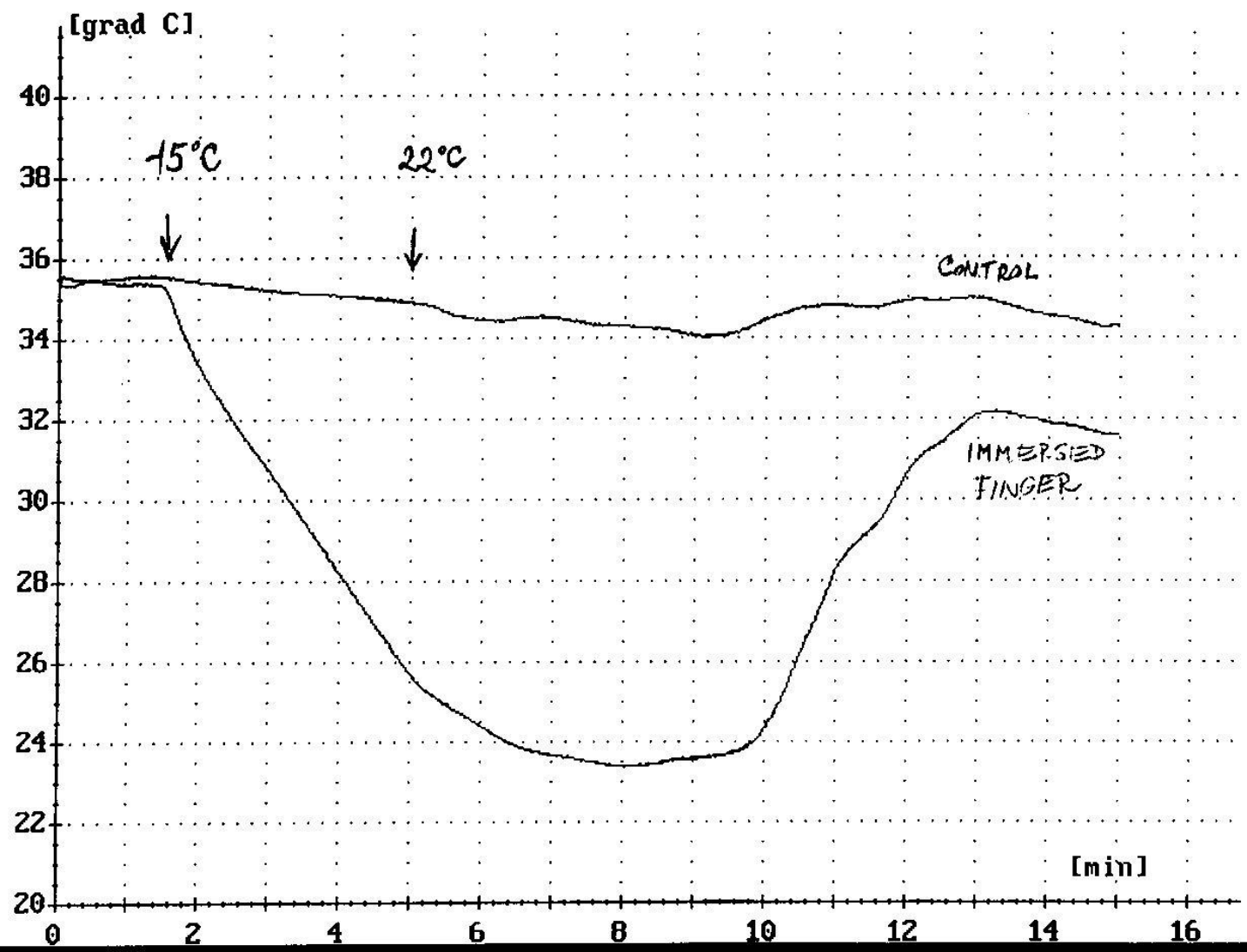
Temp. sensor 1

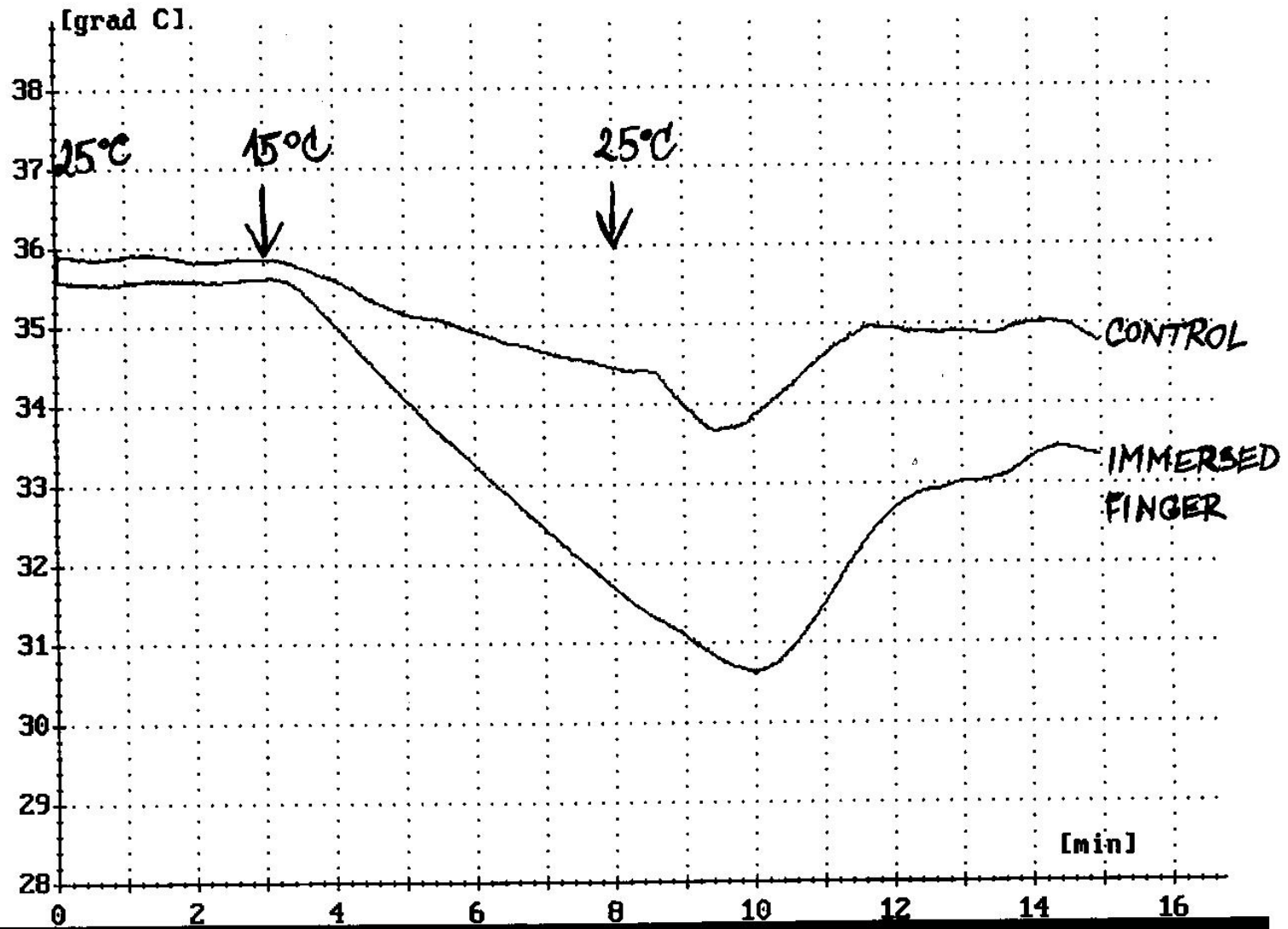
Task 2



Stepladder

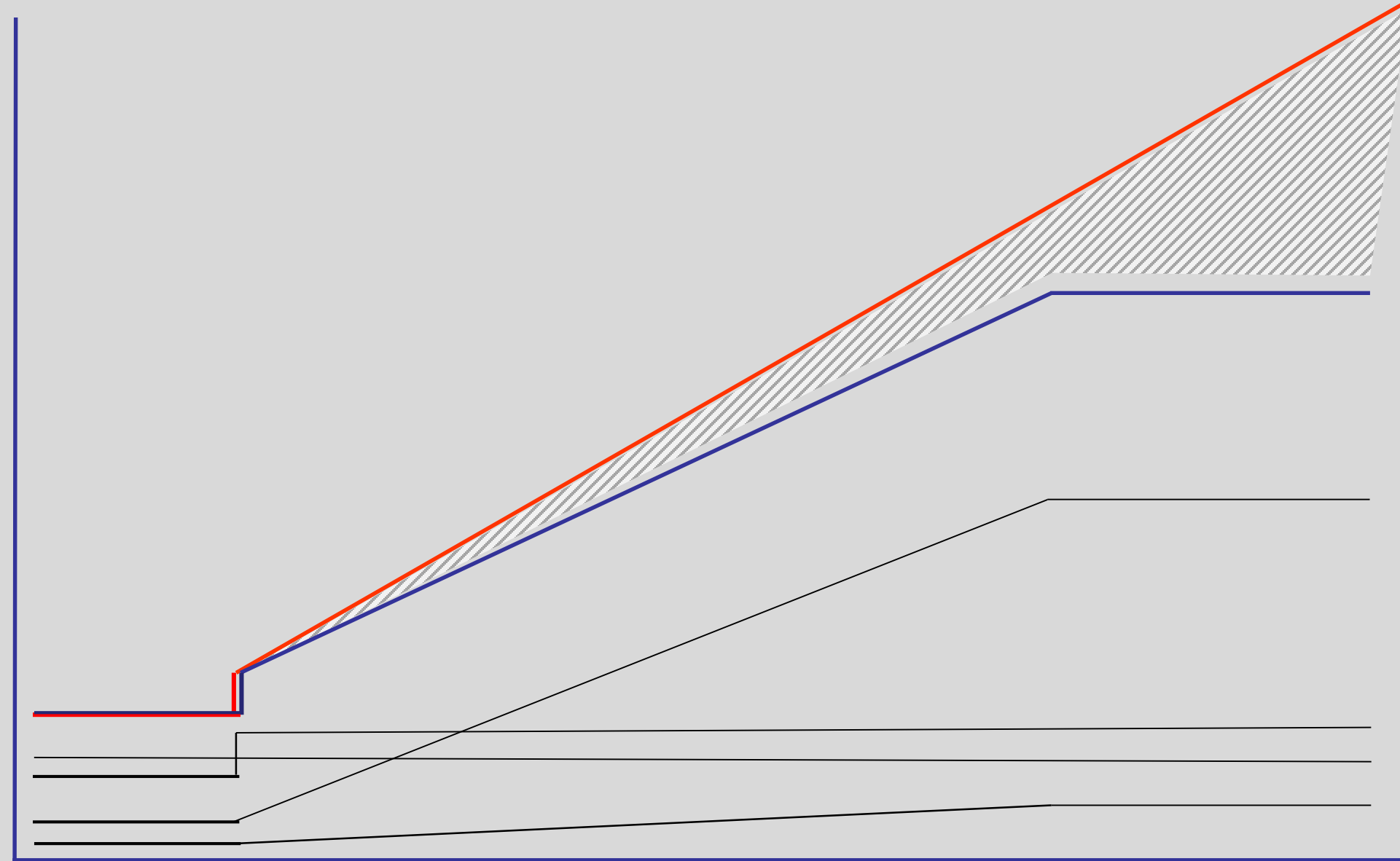
Temp. sensor 2





Energetic exchange (kcal/h)

Total heat production



Total heat loss

Evaporation:
Skin and lungs

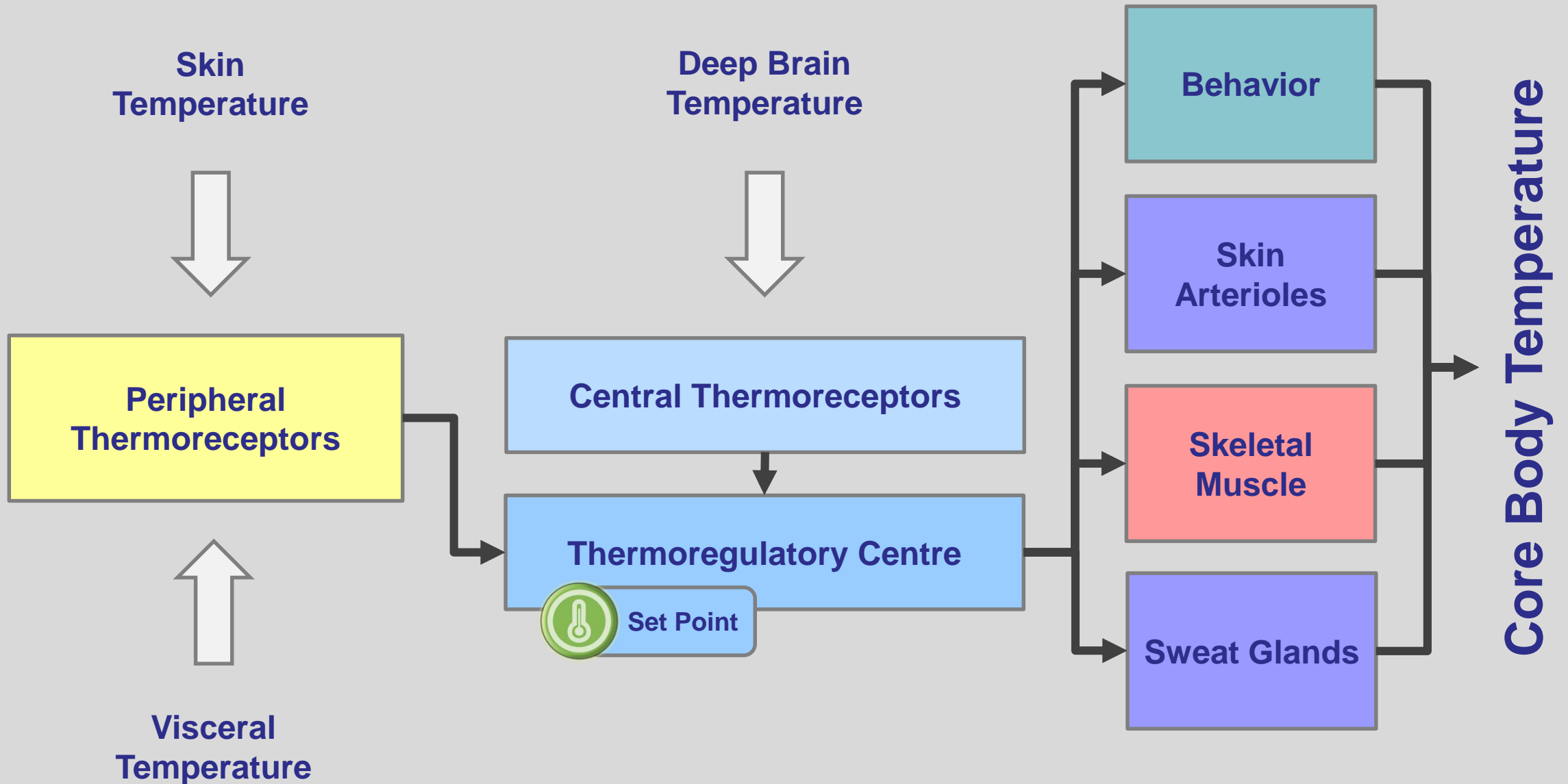
Convection
Radiation, Conduction
Convection - expired air

Rest

Exercise

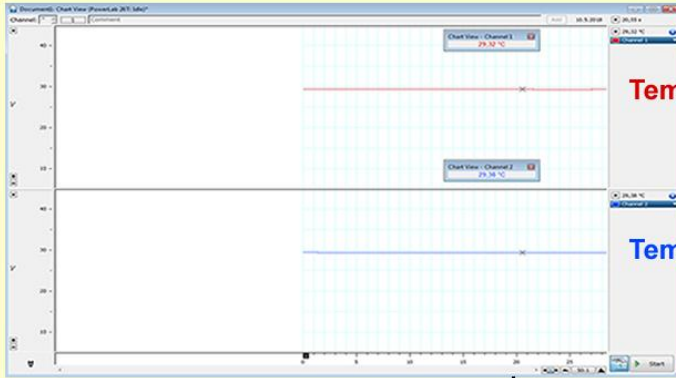
Exercise (J)

Ambient Temperature



TEMPERATURE MEASURING SETUP

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PowerLab system



Temp. transducer 1

Temp. transducer 2

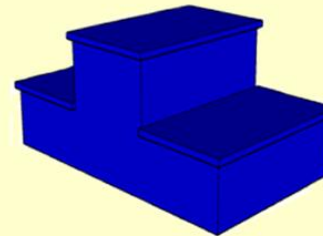
Temp. sensor 2

Temp. sensor 1

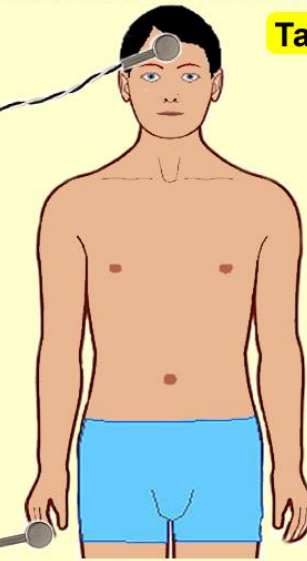
Task 2

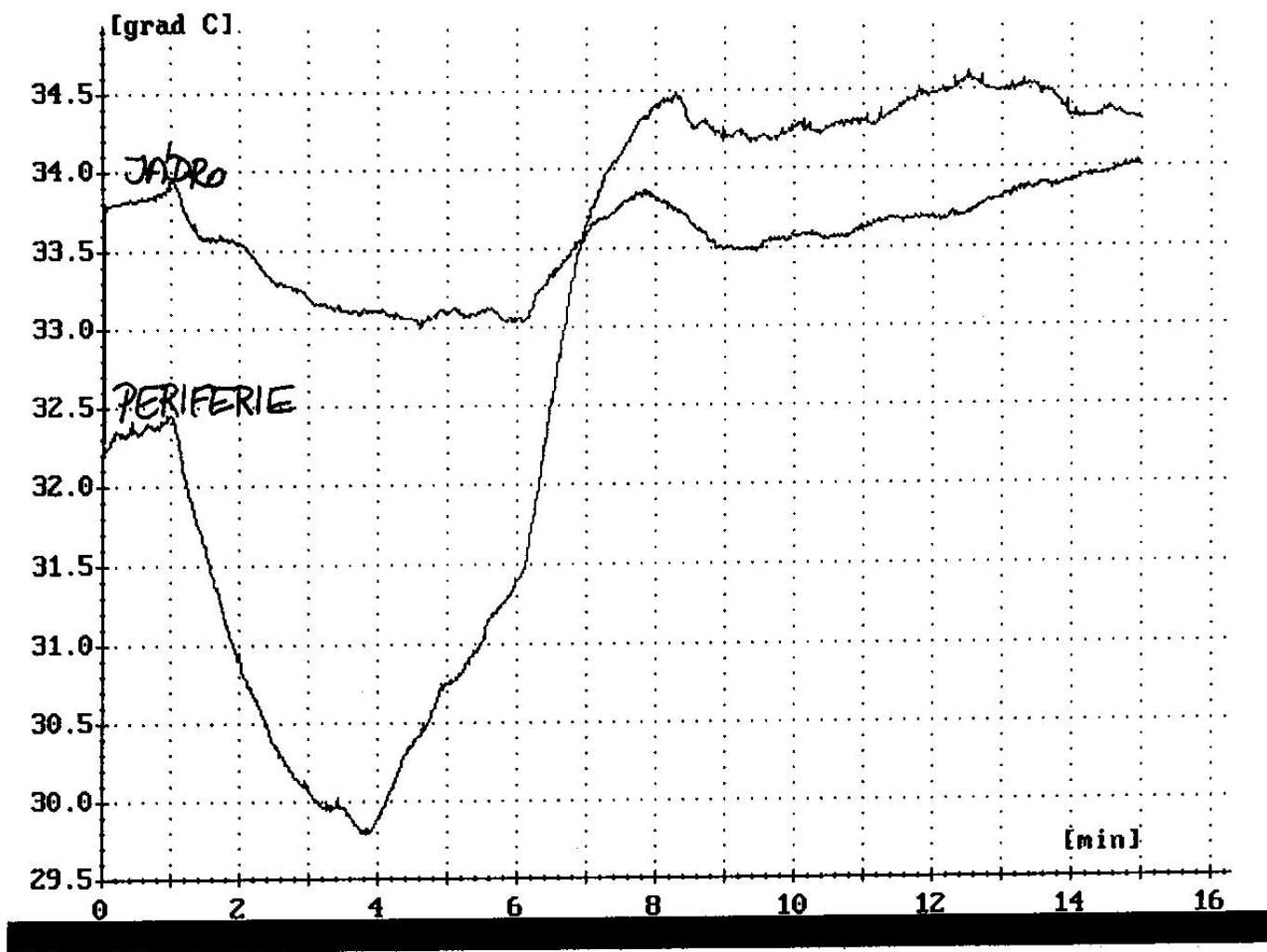
Temp. sensor 1

Stepladder

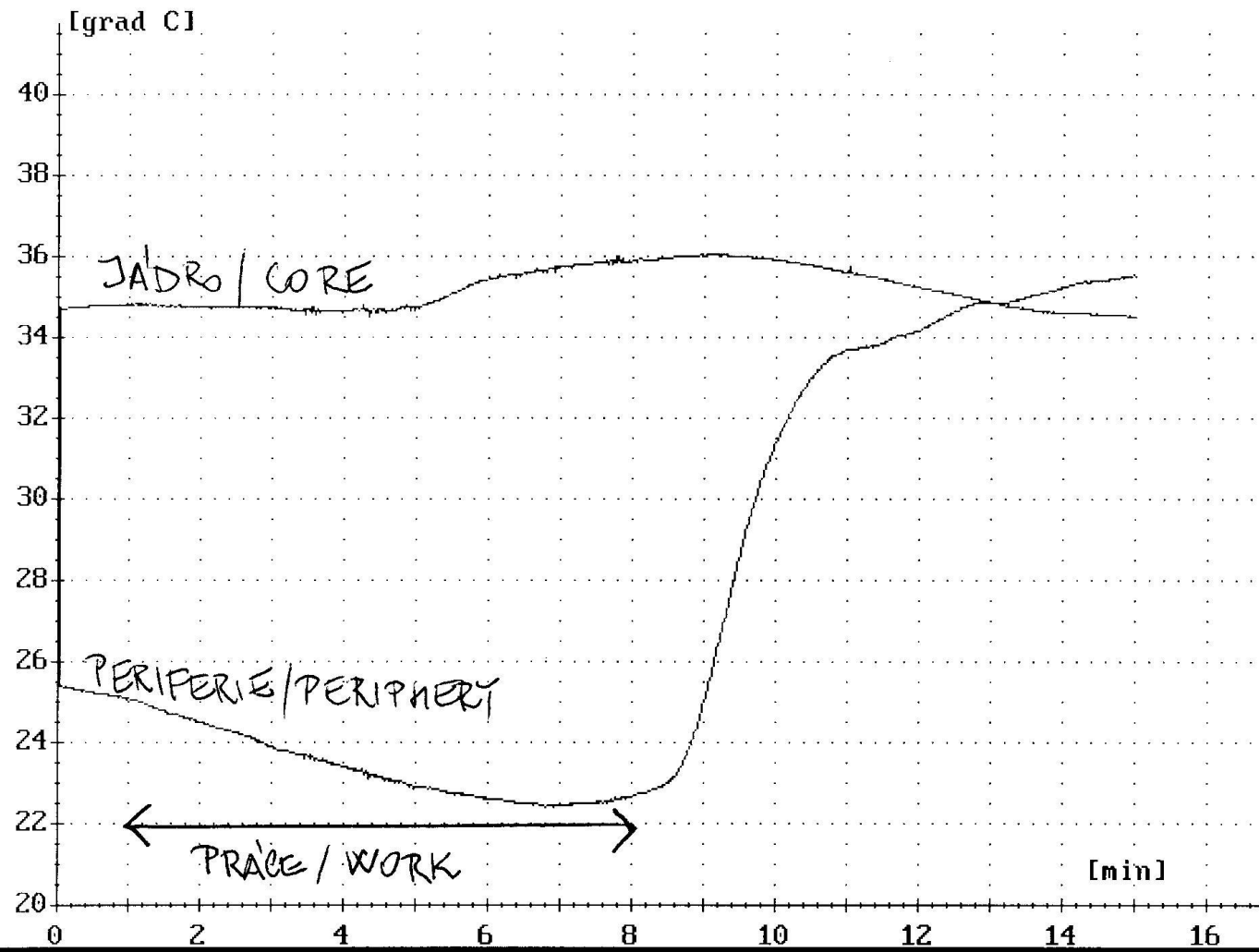


Temp. sensor 2

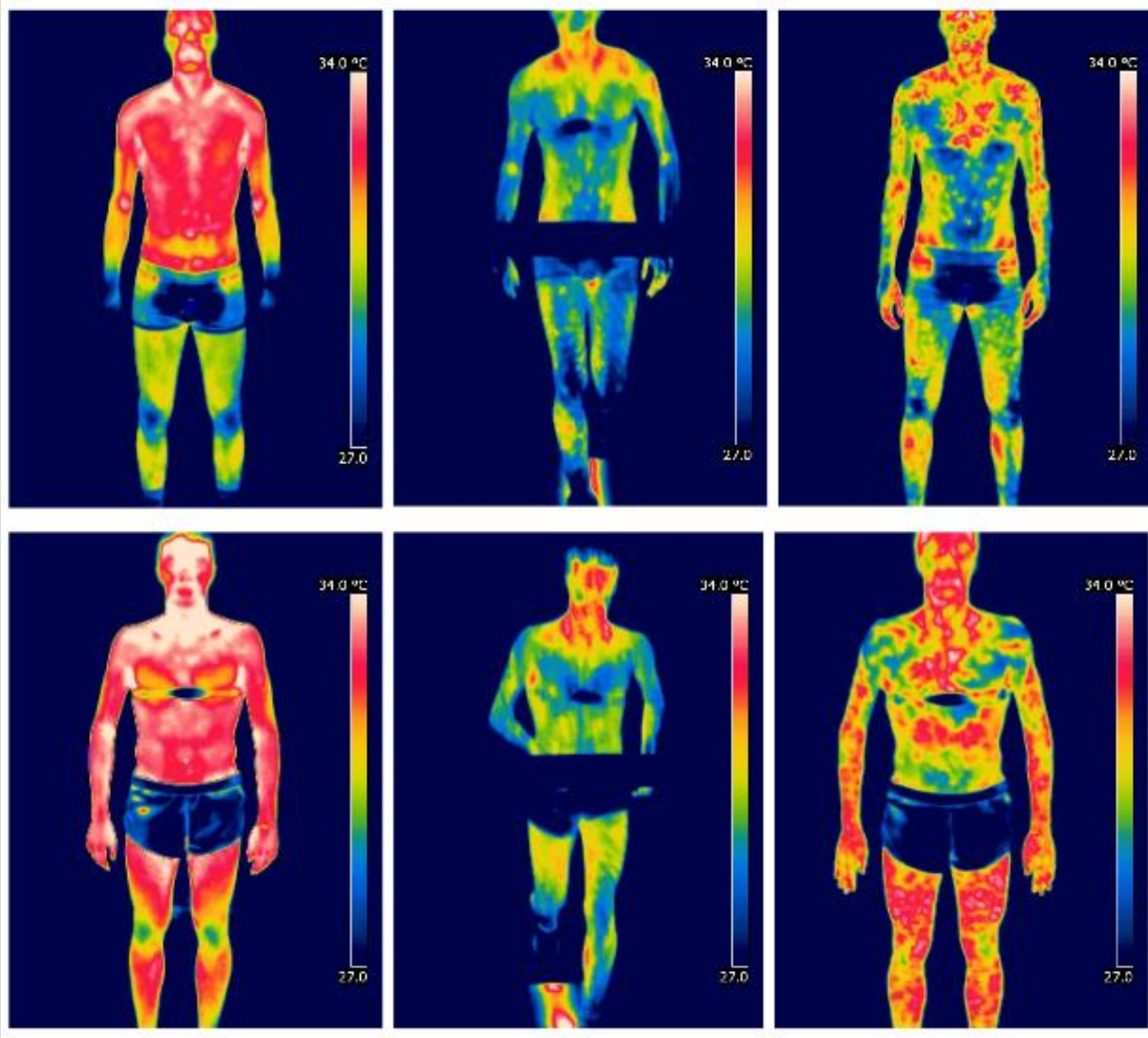




PRACE



Infrared Thermography



Infrared thermal images of the anterior body for two athletes before, during and after exercise

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