

# **FLG 332 – STUDY THEME 1 : BODY TEMPERATURE**

## **STUDY THEME 1.1- TEMPERATURE HOMEOSTASIS**

### **1- BODY TEMPERATURE**

- Average body temperature is 37°C
- Body temperature range is 36°C –37.5°C.
- Subject to considerable variation as it varies from person to person
- Also varies with metabolic activity and environmental circumstances
- Temperature determines the movement of the molecules.
- Heat energy: allows chemical reactions.
- Temp influences metabolic processes =speeds up or slows down
- High temperature destroys protein.
- Low temperature: inhibits enzymatic reactions and prevents biochemical processes
- Low or high temperature is corrected by homeostasis
- Skin plays a major role in thermoregulation.
- Homeotherms = constant body temp
- Poikilotherms (reptiles)= change body temp according to external env. Body can be divided into 2 temperature regions:

#### **1.1- THE 2 TEMPERATURE REGIONS:**

The body can be divided into 2 temperature regions:

1. A warm internal core
  2. A cooler outer shell
- temperature > Shell temperature

#### **Core temperature:**

- Temperature of the deeper tissues
- Relatively constant (36.5- 37.5°C )
- Metabolism works at its optimum

#### **Shell temperature:**

- Skin temperature
- Fluctuates substantially ( 20-40°C)
- Depends on surroundings
- Shell insulates heat within the core

- Heat is generated in the core and is trapped in the body by the insulation provided by the shell
- The blood serves as the major agent for heat transfer
- The body can survive a decrease in core temp up to 14°C BUT it cannot survive an increase in temperature of more than 7°C
- Temperature greater than 43°C :Cardiorespiratory failure occurs – Comatose , serious brain damage , convulsions and shock

#### **1.2- MEASURING TEMPERATURE**

- Core temperature is measured with a rectal thermometer

- Rectal temp is  $0.5^{\circ}\text{C}$  higher than oral temp

Common places to measure temperature with thermometer:

- In the anus (Rectal temperature)
- In the mouth (Oral temperature)
- Under the arm (Axillary temperature)
- In the ear (Tympanic temperature)
- On forehead skin over the temporal artery

## 2- FACTORS INFLUENCING BODY TEMPERATURE

### Possible Paragraph Question

#### 1) Age

- Infants vary according to the environment (Babies are smaller thus they have a greater surface area and can lose heat quickly. Their thermoregulation centre is underdeveloped so they cannot shiver)
- In children more ( $0.5^{\circ}\text{C}$ ) than the adult
- Old age decreases temperature (Thermoregulation centre is degenerating therefore body temperature cannot be regulated)

#### 2) Sex

- Females have lower body temperatures than males (Less muscle mass than males – muscle mass generates heat)

#### 3) Diurnal Variation

- Minimum values in the morning and maximum values in the evening (heat absorption from sun)

#### 4) Meals

- Body temperature increases after meals

#### 5) Exercise

- During vigorous exercise, heat production from skeletal muscles can increase

#### 6) Menstrual cycle

- Body temperature increases during ovulation

#### 7) Sleep

- Body temperature decreases by  $0.5^{\circ}\text{C}$

#### 8) Emotions

- Body temperature increases

## 3- TEMPERATURE REGULATION

### Possible MCQ Questions

- Thermoregulation: Maintenance of a constant body temperature
  - A balance between heat gain and heat loss
  - Heat gain > Heat loss : Temperature increases
  - Heat gain < Heat loss : Temperature decreases
- Regulated by temperature regulating centres located in the *Hypothalamus*
  - Nervous system and endocrine system – Thermoregulatory centre is hypothalamus

