

## Case 2

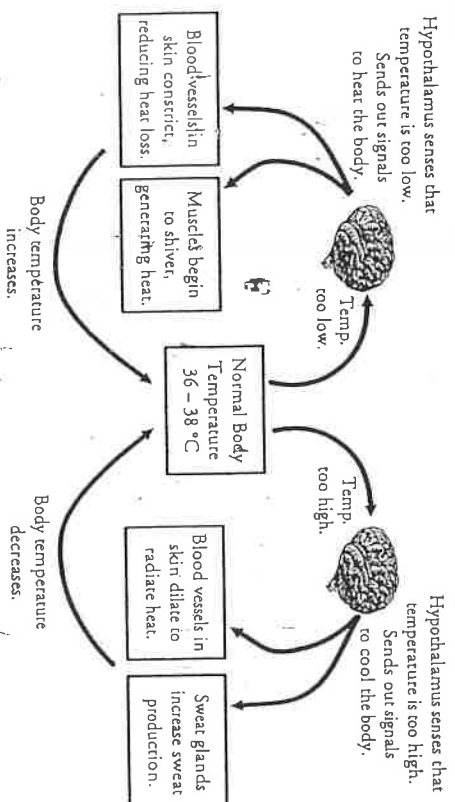
The patient is a 22-year-old male who was admitted to the hospital for spiral fracture of his right fibula. Patient history revealed sedentary lifestyle with poor nutritional habits. He is a focused university student who studies 18 hours a day and eats very little when stressed. For the last three weeks he reported general weakness and body pains. Trauma occurred when he jumped down three stairs while running to his final exam before Christmas. The physician was concerned about potential physiological factors weakening the bone and ordered blood tests and a hormone panel. In addition to the following results the blood report noted low calcium levels and elevated bone alkaline phosphatase (ALP-2).

HORMONE	PATIENT	STANDARD VALUE
Adrenocorticotropic (ACTH)	9.3	1.3 – 16.7 pmol/L
Aldosterone (Normal Sodium Diet Adult)	0.85	0.52 – 0.94 nmol/L
Cortisol serum	am 567	am 110 – 607 nmol/L pm 83–469 nmol/L
Calcitonin	4.3	Female < 6.4 ng/L Male < 13.8
Parathyroid Hormone (PTH)	5.7	1.2 – 5.8 pmol/L
Thyroxine (T4 free serum)	13.2	8.5 – 15.2 pmol/L
Thyroid-Stimulating Hormone (TSH)	4.5	0.4 – 5.0 µIU/mL
Vitamin D - Cholecalciferol	12	60 – 105 nmol/L
Insulin	53	36 – 179 pmol/L
Glucagon	175	50 – 200 ng/L

### QUESTIONS

- 1) How are the blood results different from normal?
- 2) Which hormones are related to this system? What does each one do?
- 3) Which glands could be responsible for this dysregulation? Explain...
- 4) What other body system(s) may be affected by this issue? Explain...

## Model 2 – Thermoregulation in Humans



8. Examine Model 2. Based on what you see in the model, propose a definition for "thermoregulation."
9. According to Model 2, what portion of the brain contains sensors that monitor body temperature?
  - a. What are two mechanisms the body uses to cool itself?
  - b. What are two mechanisms the body uses to heat itself?
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  - a. What are two mechanisms the body uses to cool itself?
  - b. What are two mechanisms the body uses to heat itself?
11. Consider the feedback loop that cools the body when it is too warm.
  - a. Identify the "stimulus" and "response" in the feedback loop.
  - b. Is this feedback loop positive or negative feedback? Justify your reasoning.