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# Homeostatic Control Mechanisms

Subject Outline terms and phrases

**osmoregulation, anti-diuretic hormone (ADH), blood volume, blood pressure, insulin, glucagon, diabetes**

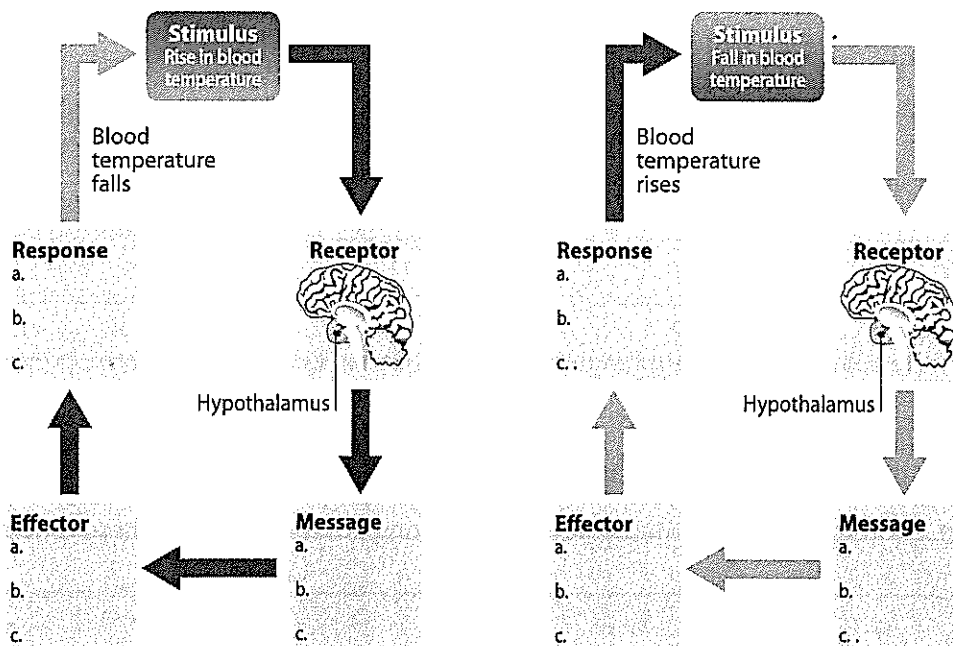
1. Complete the following table to show which body systems are involved in controlling the internal conditions listed.

Internal condition	Nervous system, endocrine system, or both
body temperature	
osmoregulation	
blood sugar level	
pH of blood	

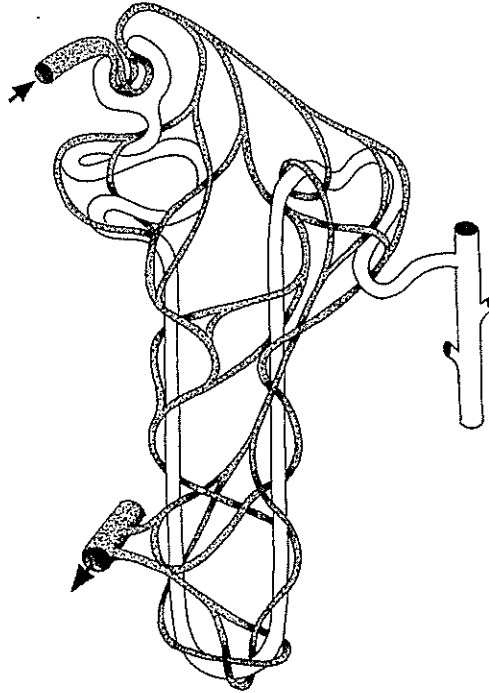
2. Complete the following table for the control of human body temperature.

Stimulus	Receptor	Message transmission	Effector(s)	Response(s)
Body temp. decreases				shivering
Body temp. increases				vasodilation
Body temp. decreases			thyroid gland	
Body temp. increases			sweat glands	
Body temp. decreases		nerve impulse		

3. Complete the labels on the following diagrams to show the **receptor, messages, effectors, and responses** involved in regulating human body temperature.



4. Label these structures on the nephron diagram below:  
**glomerulus, Bowman's capsule, tubule, collecting duct, capillary network, arteriole, venule**



5. Use the terms **filtration** and **reabsorption** to explain how a nephron works.

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6. (a) Describe the role of anti-diuretic hormone (ADH) in osmoregulation, including its effect on aquaporins.

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- (b) Explain how the water content of the blood (osmoregulation) affects blood volume and blood pressure.

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7. Complete the table below using the words **higher**, **lower**, or **same** to describe the concentrations of the following substances in the filtrate and urine, compared to their concentration in the plasma.

Substance	Percentage present in:		
	Plasma	Filtrate	Urine
water	90.0	higher	
urea	0.03		
glucose	0.1	same	
inorganic ions	0.72		
protein	8.0		lower

8. Name the structures in the correct sequence to describe the pathway that would be followed by (a) water, and (b) glucose from the time they enter the afferent vessel (from the renal artery).

(a) water \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

(b) glucose \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

9. (a) What are the main target tissues for insulin, and what is the effect of insulin on the cells of these tissues?

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 \_\_\_\_\_

- (b) What are the main target cells for glucagon, and what is the effect of glucagon on these cells?

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- (c) How do insulin and glucagon work together to regulate blood sugar level?

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10. Describe how diabetes can result from a hormonal imbalance.

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11. Explain how pH is monitored in the brain to maintain a constant carbon dioxide level in the blood.

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