

**GCSE Biology B (Twenty First Century Science)**  
**J257/04** Depth in biology (Higher Tier)

**Question Set 5**

- 1** The human body responds to changes so that it can maintain a constant internal environment.
- (a)** Many of these responses involve muscles as effectors.
- Muscles are made of cells.
- Explain why muscle cells have more mitochondria than most other types of cell in the body.
- (b)\*** When temperature receptors in the skin and hypothalamus detect a drop in temperature, the hormone adrenaline is released from the adrenal gland. **[2]**
- Explain how the release of adrenaline could help the body to raise its core temperature back to normal. **[6]**
- (c)** The sensitivity of cells to the hormone adrenaline is increased by the hormone thyroxine.
- (i)** Explain how the production of thyroxine is regulated by negative feedback.
- (ii)** Hormones stimulate cells by binding to receptors on the cell surface. These receptors are protein molecules. **[3]**
- Suggest how the hormone thyroxine could cause a cell to become more sensitive to the hormone adrenaline. **[4]**

**Total Marks for Question Set 5: 15**

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