

Chemical signalling · supported focus

Supported focus · HL

Supported scope

- Supported HL focus. First assessment 2025; current subject brief acquired; full Biology guide not acquired. Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

Signalling · 1.1

Reasoning

Two cell types encounter the same signal but respond differently. Their receptors and internal pathways determine what follows. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

Signalling · 2.1

Reasoning

A signalling molecule binds a compatible receptor. Receptor activation can initiate signal transduction through intracellular molecules. The resulting response may change enzyme activity, transport or gene expression. A signal need not enter the cell to cause an effect. receptor: A molecule that binds a compatible signal; signal transduction: Conversion of signal reception into intracellular changes.

Signalling · 3.1

Reasoning

Distinguish signal reception, transduction and response. Amplification can allow a small extracellular change to produce a larger intracellular effect. Different receptors or pathways can give different responses to one signal. Use an attributed dataset comparing signal concentration and response. Include an untreated control and, where supplied, receptor-blocking evidence. Do not infer the whole pathway from a concentration-response graph alone.

Signalling · 4.1

Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: response increases from 20 to 80 units. Fold change = $80/20 = 4$. Percentage increase = $(80-20)/20 \times 100 = 300\%$. A fourfold final value is not a 400% increase.

Signalling · 4.2

Reasoning

Response rises from 10 to 50 units. Calculate the fold change. Use the same sequence: known quantities → model → relation → substitution → unit and interpretation.

Signalling · 5.1

Reasoning

A receptor is not interchangeable with every signalling molecule. Greater signal concentration does not imply unlimited response once the system saturates. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Signalling · 5.2

Reasoning

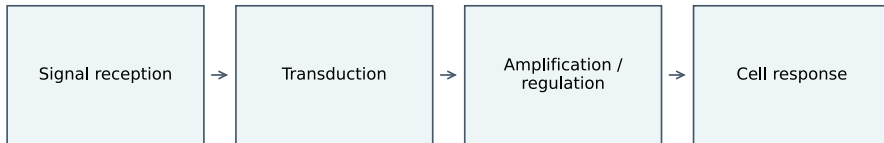
Fourfold final response means a 400% increase from baseline. This claim is false: A receptor is not interchangeable with every signalling molecule. Greater signal concentration does not imply unlimited response once the system saturates.

Signalling · 5.3

Reasoning

Cell signalling: a receptor selects the response: Distinguish signal reception, transduction and response. Amplification can allow a small extracellular change to produce a larger intracellular effect. Different receptors or pathways can give different responses to one signal.

Signalling · diagram



- Original teaching diagram: Cell signalling: a receptor selects the response
- Use the labels and the stated model together.

Signalling · original transfer

Your turn

A fictional response changes from 20 to 60 units with ligand dose. Find fold change and percentage increase. Why does this not show that three times as many receptors exist?

Signalling · transfer reasoning

Method and interpretation

Threefold final value and 200% increase. Signal amplification, saturation and normalization can alter response; receptor abundance needs its own measurement.

Check yourself

- Explain receptor using the stated model.
- Explain signal transduction using the stated model.
- Change one value in the original transfer; explain which assumption still matters.