SCIENCE FOUNDATIONS

Active and passive transport

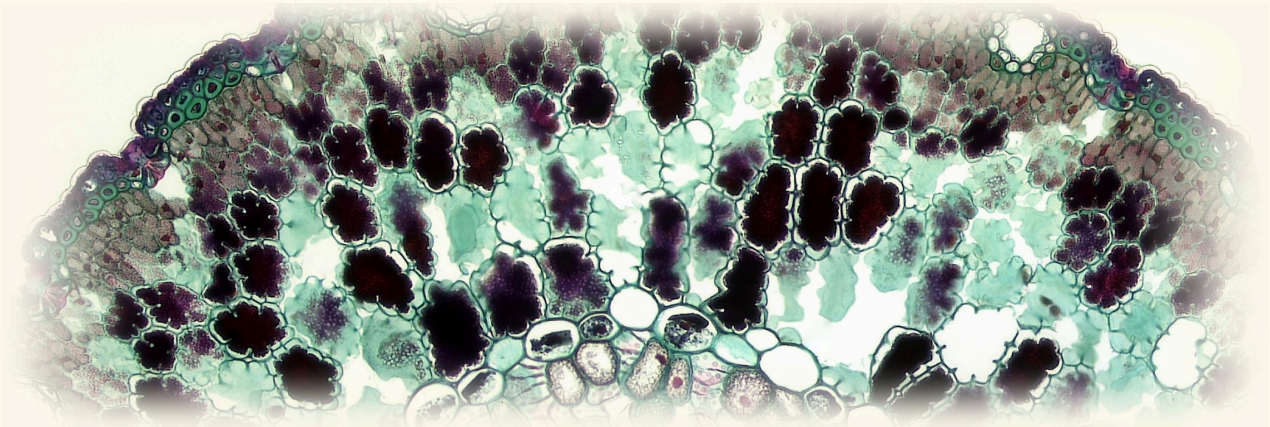
Difficulty level: Intermediate

Science Foundations

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Overview of the concept

This is how you explain how your cells take in nutrients and push out waste, with some substances drifting in on their own and others needing energy to cross. Oxygen drifts into a cell on its own, since it moves from where there is more of it to where there is less. Other substances have to be pumped in against that flow, and the cell spends energy to do it, like carrying a load uphill. Your body runs on both kinds of movement, and knowing which is which explains how nutrients get in and waste gets out.



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Rule

Active and passive transport: active transport moves substances against the concentration gradient, from low to high, and needs energy.

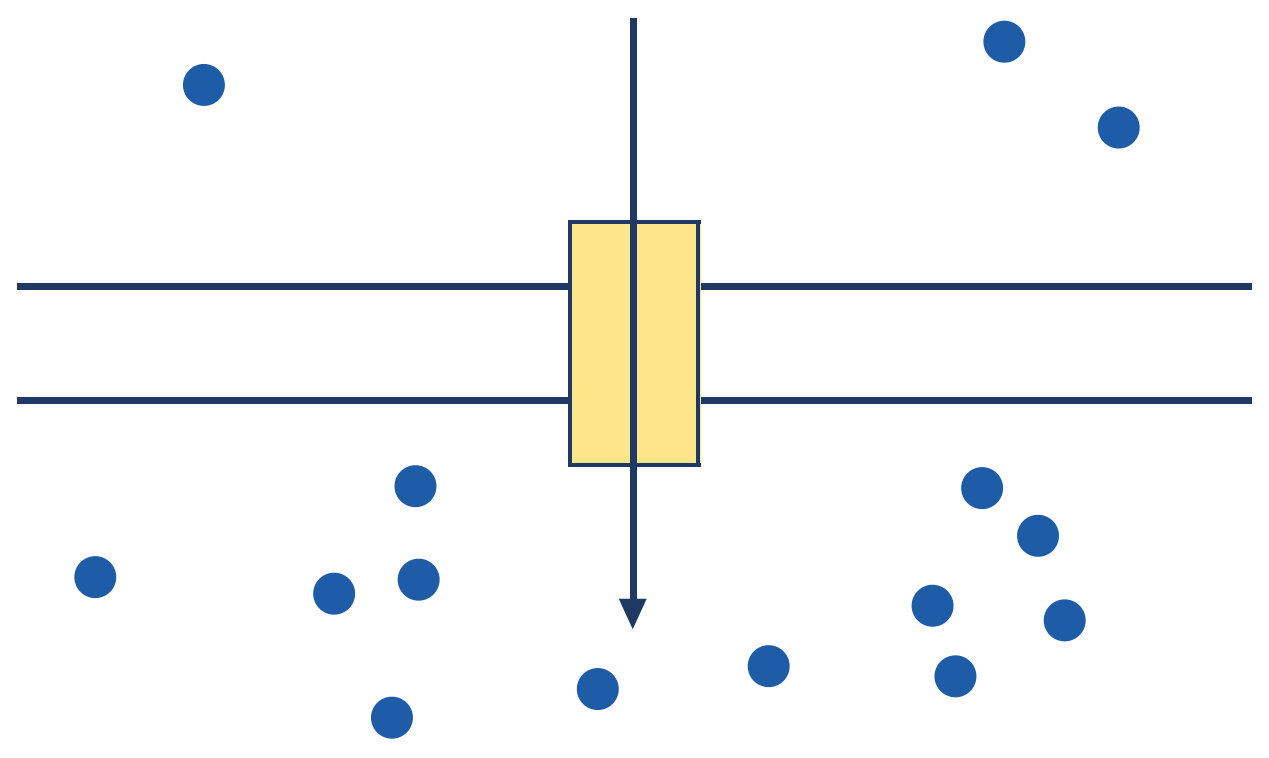
Passive transport moves substances down the gradient, from high to low, and needs no energy.

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Worked examples

EXAMPLE 1

Q Classify: a cell pumps ions from low to high concentration.



SOLUTION

Check the direction: low to high is against the gradient.

Against the gradient needs energy.

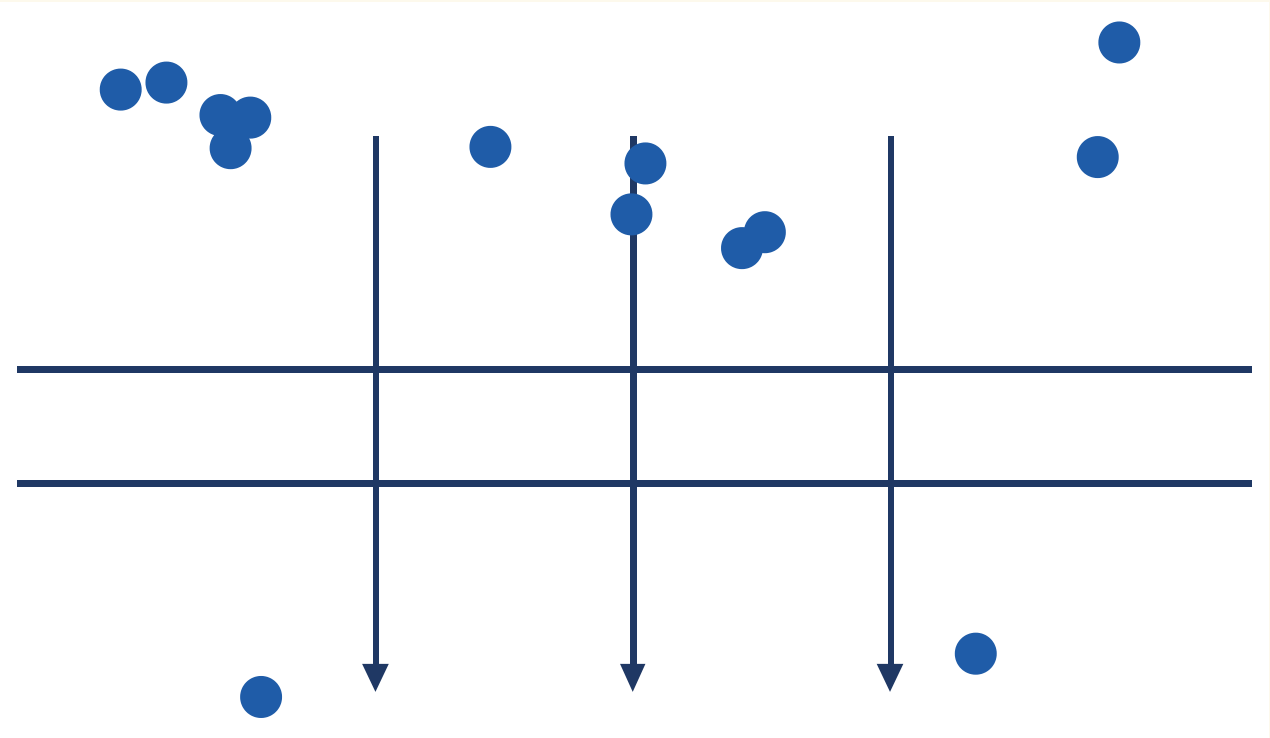
Label it active transport.

The result is active transport.

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EXAMPLE 2

Q Classify: oxygen diffuses into a cell from high to low concentration.



SOLUTION

Check the direction: high to low is down the gradient.

Down the gradient needs no energy.

Label it passive transport.

The result is passive transport (diffusion).

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Practice questions

1

Active transport needs energy?

A Yes

B No

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2

Passive transport needs energy?

A Yes

B No

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3 Low to high: active or passive?

A Active

B Passive

C Both

D Neither

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4 High to low: active or passive?

A Active

B Passive

C Both

D Neither

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5

What energy molecule is used?

A ATP

B ADP

C DNA

D Glucose

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6

Carbon dioxide leaves a cell by diffusion. Active or passive?

A Active

B Passive

C Both

D Neither

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7

A cell uses ATP to move glucose against its gradient. Active or passive?

A Active

B Passive

C Both

D Neither

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8

What is facilitated diffusion?

A Active movement using ATP

B Movement of water only

C Passive movement helped by proteins

D Movement against the gradient using energy

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9

Do carrier proteins help active transport?

A Yes

B No

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10

Which moves against the gradient?

A Active transport

B Passive transport

C Diffusion

D Osmosis

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ANSWER KEY

1. Yes

2. No

3. Active

4. Passive

5. ATP

6. Passive

7. Active

8. Passive movement helped by proteins

9. Yes

10. Active transport

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