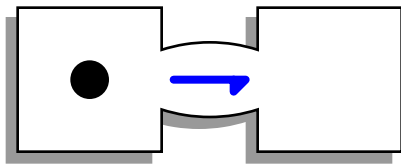


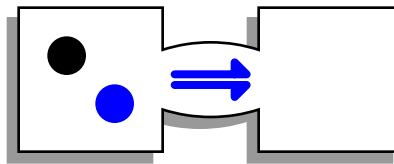
Cells use a phospholipid bilayer as a membrane to bind together the contents of the cell. In order to transport substances into and out of the cell, proteins serve as doors in the cell membrane.

In each of the following puzzles, the goal is to maneuver all the blue balls (objects) into the blue circles (receptors) by moving the black ball.

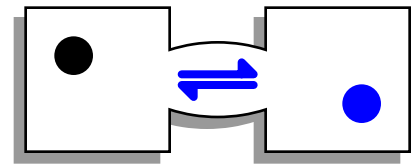
In order to move around this cellular maze, you must use the cell wall transport proteins (arrows). Like their real-life counterparts, these transporters facilitate movement of objects according to certain rules:



Uniport proteins allow only one-way movement of an object. In the puzzle, these will serve as one-way doors for the black ball.

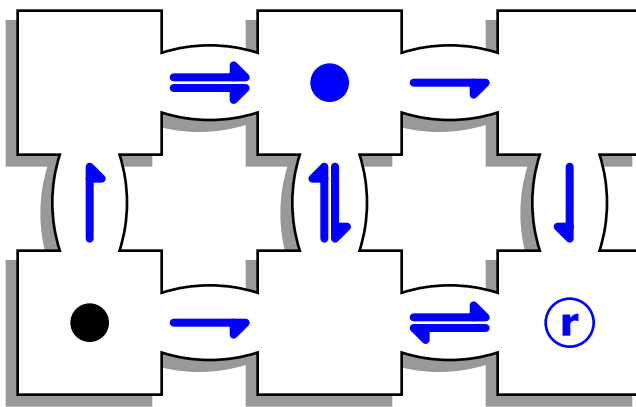


Symport proteins allow an object to pass only when it is accompanied by a partner. You can move the black ball through a symporter only if a blue ball moves with you.



Antiport proteins allow one object to enter the cell only if another leaves. You can move the black ball through an antiporter only if there is a blue ball on the other side to switch places with you.

Example



Remember, the blue balls can only move in conjunction with the black ball. They cannot move alone. The receptors (the blue circles) cannot move. The puzzle is complete only once all of the receptors are filled by one blue ball each.

Solution

