

Learning Constellation on Osmosis

Goal of the simulation:

Participants experience how osmosis works: **free water always moves towards the side where there is less free water available (where solute concentration is higher).** Through moving in the room, the logic of osmosis becomes embodied – the dynamic becomes physically tangible.

Preparation in the room

Mark a circle → this represents the cell membrane.
Inside = cytosol / cell interior, outside = external environment.

Roles:

- Cell membrane: 6–12 participants form the circle
 - Salt particles inside: 3 participants
 - Salt particles outside: 3 participants
 - Water particles: 6–10 participants move freely around the membrane
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Process of the simulation

1. Starting situation – equilibrium:

Water particles move slowly back and forth between inside and outside – roughly evenly distributed. The concentration of free water is similar on both sides.

2. Variant – hypertonic outside:

The facilitator increases solute concentration outside (1–2 additional participants move “outside” to salt).

Water particles react: they move more strongly to the outside.

The cell loses water – it shrinks.

3. Variant – hypertonic inside:

Now the solute concentration is increased inside (more salt particles move “inside”).

Water particles now move inward.

The cell gains water – in animal cells this can even lead to bursting.

Didactic notes

- Use the language of “free water particles” consistently
 - Let participants verbally describe what they are experiencing
 - Ideal for introduction, review or exam preparation
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Reflection questions

- Where was there most free water? Why?
- How did the dynamic feel: being pulled or being pushed?
- Where do you see this principle in everyday life? (salt on cucumbers, salt in winter, osmosis in the kidneys)
- Could osmosis occur without a concentration difference?