Supplementary Table 5:

Set of equations governing the changes of volume and osmotic pressure

$$\Pi_e = \Pi_e^f \left(1 - \boldsymbol{exp}\left[-\left(t - t_0\right)/\lambda_m\right]\right) + \Pi_e^0 \cdot \boldsymbol{exp}\left[-\left(t - t_0\right)/\lambda_m\right] \tag{6.1}$$

$$\Pi_t = \Pi_t^0 \cdot \left(1 - \frac{V_{os}^0 - V_{os}}{V_{os}^0 - V^{\Pi_t = 0}}\right) \tag{6.2}$$

$$\frac{d}{dt}\Pi_i = \Pi_i \cdot \frac{dc}{c \cdot dt} \tag{6.3}$$

$$\frac{d}{dt}c = v_{12} - v_{13} - c \cdot V_{ratio} \tag{6.4}$$

$$\frac{d}{dt}V_{os} = -G \cdot L_p\left(\Pi_t + \Pi_e - \Pi_i\right) \tag{6.5}$$

$$V_{os} = V_{total} - V_b \qquad \frac{d}{dt}V_{total} = \frac{d}{dt}V_{cyt} = \frac{d}{dt}V_{os} \tag{6.6}$$

$$V_{ratio} = \frac{dV_{os}}{V_{os} \cdot dt} \tag{6.7}$$

Parameters

$\lambda_m = 0.3s$

$Lp = 1.19 \cdot 10^{-12} m^4 J^{-1} s^{-1}$

$V_{total}^0 = 6.5 \cdot 10^{-17} m^3$ $\qquad V_b = 0.4 \cdot V_{total}^0$

$V_{nuc} = 0.15 \cdot V_{total}^0$ $\qquad V_{cyt}^0 = V_{total}^0 - V_{nuc}$

$V^{\Pi_t = 0} = 0.63 \cdot V_{os}^0$ $\qquad V_{os}^0 = \cdot V_{total}^0 - V_b$

$G = 7.85 \cdot 10^{-11} m^2$ $\qquad c^0 = 600mM$

$\Pi_t^0 = 0.875 \cdot 10^6 J\ m^{-3}$ $\qquad \Pi_i^0 = 1.5 \cdot 10^6 J\ m^{-3}$ $\qquad \Pi_e^0 = 0.625 \cdot 10^6 J\ m^{-3}$

For the change of the external osmotic pressure the formula given by Martinez de Maranon et al.[2] was applied, which takes into account the mixing time, i. e. the time of the sample with salt. Here, λ_m is the time constant of the mixing chamber and Π_e^f is the final external osmotic pressure after mixing.

The concentration $c = c(t)$ in Equations (6.3) and (6.4) refers to the total concentration of osmotically active compounds. Its initial concentration is calculated from $\Pi_i^0 = c^0 \cdot RT$ (R – gas constant, $T = 300\ K$ – temperature).

V_{total} is the total cell volume, $V_{os} = V_{total} - V_b$ is the osmotically changeable volume, V_b is the volume (constant value) not affected by osmotic changes.

Note that the conservation relations over time only hold for absolute molecule numbers since the cell volume is changing.