
Supplementary information

**Cell cycle-specific phase separation
regulated by protein charge blockiness**

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Supplementary Note

Cell cycle-specific phase separation regulated by protein charge blockiness

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Mathematical equations

1. Definition of Degree of Segregation (D_{seg})

$$D_{\text{seg}} = -\log_{10}(p\text{-value}_{\text{U-test}[p^+, p^-]}),$$

, where p^+ and p^- represent the position of positively and negatively charged amino acids along the polypeptide, respectively.

2. Definition of Blockiness of Like Charges (B_{LC})

$$B_{\text{LC}} = (C_{\text{max}(+)} + C_{\text{max}(-)}) * \frac{\sum_{k=1}^{Nd(+,-)} d_k(+, -)}{Nd(+, -)} / \left(\frac{\sum_{k=1}^{Nd(+,+)} d_k(+, +)}{Nd(+, +)} + \frac{\sum_{k=1}^{Nd(-,-)} d_k(-, -)}{Nd(-, -)} \right)$$

, where $C_{\text{max}(+)}$ and $C_{\text{max}(-)}$ represents the absolute maximum positive and negative values in the charge plot, respectively, $d(+, +)$, $d(-, -)$, $d(+, -)$ represent the distance between a pair of charged residues (+; positive charge, -; negative charge) and $Nd(+, +)$, $Nd(-, -)$, $Nd(+, -)$ represent the number of these pairs.

3. Fitting equation to obtain C_{sat}

$$\text{OD}_{600} = \text{OD}_{\text{max}} C^n / (C_{\text{sat}}^n + C^n),$$

,where C represents the protein concentration.

4. Fitting equation for FRAP assay

$$f(t) = I_{\text{max}} \left(1 - \sqrt{\frac{\tau D}{\tau D + \pi t}} \right) + C$$

5. Threshold for analyzing the localization of Ki-67 at the mitotic chromosome periphery

$$\alpha = (\text{95th percentile of signal} - \text{5th percentile of signal}) * 0.8$$