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【936】Mitochondrial Pearling Distributes mtDNA Nucleoids

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The dynamic mitochondrial network functions as the cellular energetic and signaling hub. Its essential multi-copy genome is packaged in nucleoids, regularly distributed along the mitochondrion, and surrounded by an intricate inner membrane that restricts movement. Each nucleoid's integrity affects local mitochondrial fitness, and dysfunctional regions are peripherally ejected for degradation.
However, the mechanisms maintaining nucleoid regular spacing and sensing and isolating damaged contents in such constrained system remain largely unknown.
Enabled by fast super-resolution and adaptive microscopy, we characterize mitochondrial "pearling"as a frequent, spontaneous and reversible biophysical instability. We propose its emergent roles in nucleoid distribution and mediating the rapid local biochemistry changes required for mitochondrial quality control.

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