nature portfolio

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Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For	all st	atistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.		
n/a	Confirmed			
	\boxtimes	The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement		
	\square	A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly		
		The statistical test(s) used AND whether they are one- or two-sided Only common tests should be described solely by name; describe more complex techniques in the Methods section.		
\ge		A description of all covariates tested		
\boxtimes		A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons		
		A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)		
		For null hypothesis testing, the test statistic (e.g. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted <i>Give P values as exact values whenever suitable</i> .		
\boxtimes		For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings		
\boxtimes		For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes		
\ge		Estimates of effect sizes (e.g. Cohen's d, Pearson's r), indicating how they were calculated		
		Our web collection on <u>statistics for biologists</u> contains articles on many of the points above.		
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Software and code

Policy information about availability of computer code				
Data collection	All source data is available from the authors upon reasonable request.			
Data analysis	TIRF microscopy data was analyzed with ImageJ Version v1.53p and Jupyter Notebook (6.4.8) was used. The data from AFM was analyzed with ImageJ (v1.53p) and with Matlab (R2016). Specifically the package FiberApp was used to analyze the persistence and contour length of FtsZ filaments in AFM experiments.			

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our policy

All source data is available from the authors upon reasonable request.

Human research participants

Policy information about studies involving human research participants and Sex and Gender in Research.

This study does not include work with humans.
This study does not include work with humans.
This study does not include work with humans.
No ethics oversight necessary, as this study does not include work with humans.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Life sciences

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

Behavioural & social sciences Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	Sample sizes were not chosen according to a statistical test, but were limited by practicality and throughput.
Data exclusions	Data from experiments was only excluded if the supported lipid bilayer in TIRF or AFM experiments were defective.
Replication	TIRF experiments were verified and reproduced with different batches of purified FtsZ WT and FtsZ L169R. All experiments were performed at least in two or more independent experiments. AFM experiments were performed with one batch of FtsZ each, but were reproduced >10 times. Total sample number for all biochemical assays and microscopy experiments was at least 2.
Randomization	This study does not include work with participants or living organisms.
Blinding	This study does not include work with participants or living organisms.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

Methods

- n/a Involved in the study Antibodies Lukaryotic cell lines Palaeontology and archaeology Animals and other organisms Clinical data
- Dual use research of concern

- n/a Involved in the study
- ChIP-seq
- Flow cytometry
- MRI-based neuroimaging