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* You should state whether an appropriate sample size was computed when the study was being designed
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For each experiment, sample size is presented in the figure legend and was chosen based on standards in the field and experimental limitations and variability.

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* You should report how often each experiment was performed
* You should include a definition of biological versus technical replication
* The data obtained should be provided and sufficient information should be provided to indicate the number of independent biological and/or technical replicates
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The number of replicates for each experiment that was performed is presented in the related figure legends. We discuss our definition of biological replication in the Statistics section of the Materials and Methods, and we provide sufficient information in our legends to understand the number of each type of replicate performed for a given experiment.

We explain our criteria for inclusion or exclusion of data in the Materials and Methods section. e.g., “K-fibers were included in the data set (Figure 2) only if their entire length stayed within the same z-plane over time”.

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* Statistical analysis methods should be described and justified
* Raw data should be presented in figures whenever informative to do so (typically when N per group is less than 10)
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Datasets were grouped by experimental conditions as indicated in the text and figure legends. Experimental conditions include type of mechanical perturbation and molecular background.

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Source data has been provided for the following figures and supplentary figures: Figure 1C, Figure 1F, Figure 2D, Figure 2F, Figure 2G, Figure 2H, Figure 3C, Figure 3F, Figure 3G, Figure 3I, Figure 4B, Figure 4E, Figure 4F, Figure 4H, Figure 4I, Figure 4J and Figure 2- figure supplement 1, Figure 2- figure supplement 3, Figure 2- figure supplement 4, Figure 3- figure supplement 1, Figure 3- figure supplement 2, Figure 3- figure supplement 3, Figure 4- figure supplement 1C, Figure 3- figure supplement 2.