Supplemental Materials

*Molecular Biology of the Cell*

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Supplementary material

Figure-S1 | Non-monotonic creep test deformations of nuclei within living nematodes are reproducible. a, Two independent creep test measurements of nematodes that were stretched ~30% exhibit comparable deformations profiles. Biological replica were performed independently by two researchers. b, The viscoelastic parameters, as evaluated by curve fitting, show comparable values with statistically insignificant differences.
Individual nuclei respond non-monotonically to constant load. Dynamic areal strain profiles of three representative nuclei within (a) muscle and (b) hypodermis tissues are depicted. The non-monotonic mechanical response shared by all nuclei in both tissues is characterized by an instantaneous elastic deformation, creep and deformation recovery.
Figure-S3 | Stress-stiffening of nuclei within living nematodes. **a,** Comparison of the deformation dynamics of muscle nuclei normalized by nematode strain within nematodes that were stretched ~15% (low load) and ~30% (high load). Compliance of nematodes under low load is higher. **b,** The evaluated viscoelastic parameters demonstrate strain-stiffening of (i) the instantaneous elastic modulus and (ii) the steady state elastic modulus, and (iii) increase of nuclear relaxation time. High load and low load curves were reproduced from figures S1a and 4a.
Figure-S4 | Ageing does not alter lmn-1 levels.  

a, *C. elegans* nematodes grow in size as they age. b, (i) Western blot of *C. elegans* samples, stained for Ce-lamin (ii) Ce-lamin levels normalized according to total protein count and nematode size.
