

FIGURE LEGENDS

FIGURE S1 Example of large oscillations of force and SL at a short SL observed under a low level of activation. A myofibril was activated with 6 mM MgADP and 1 mM MgATP in the absence of Ca^{2+} . The traces of force (top) and change in individual SLs (bottom; sarcomere numbers, S1-S9, correspond to those in the top micrograph) are shown. During oscillation the average SL of each sarcomere was $\sim 2.35 \mu\text{m}$. The horizontal scale bar, 10 μm . The vertical scale bar in the bottom trace, 0.5 μm .

FIGURE S2 Resting force-SL relationship. The resting force measured without activation (filled circles), and after 1-5 times activations either by 6 mM MgADP (open squares) or by 14 mM MgADP (crosses) are shown.

FIGURE S3 Force-SL relationship with the standard deviation of SL. The plots with mean \pm SD for SL are shown in A and B, which correspond to those in Figs. 4 and 7, respectively. The SD in each plot (horizontal bars) was calculated from the individual SLs throughout the myofibril as shown in Fig. 2 B.

FIGURE S4 Effect of dextran obtained from the model analysis. To demonstrate the effect of dextran, the sarcomeric volume was reduced by 8 to 12% in the presence of 6 mM MgADP (lower and upper solid lines, respectively), which corresponds to 4 to 6% changes in the lattice spacing by the addition of 1% dextran (Fig. 6 B). The dashed line shows the relationship without dextran. For comparison with the experimental data, see Fig. 7.

FIGURE S5 Force-SL relationship obtained from the Eq. A7 in Appendix. The force-SL relationships at various [MgADP] are shown. [MgADP] is shown above each trace. (*Inset*) The active force depending on [MgADP] at two different SLs, 2.5 μm (solid line) and 2.9 μm (dashed line). For comparison with the experimental data, see Fig. 4.

Movie S1 Spontaneous oscillation in a myofibril at short SL, corresponding to Fig. S1.

Movie S2 Force development in a myofibril at a middle SL, corresponding to Fig. 3 A.

Movie S3 Force development in a myofibril at a long SL, corresponding to Fig. 3 B.

Figure S1

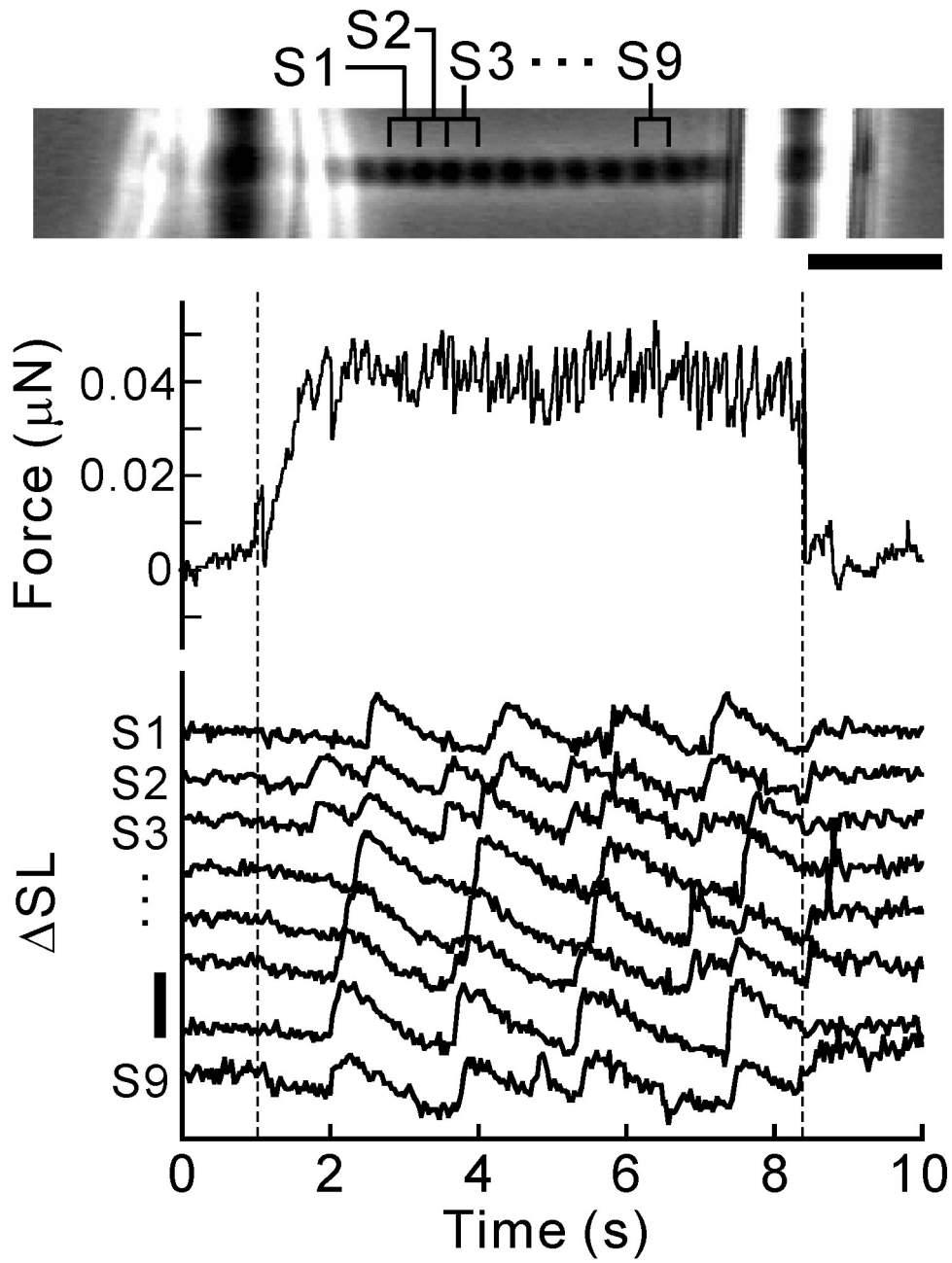


Figure S2

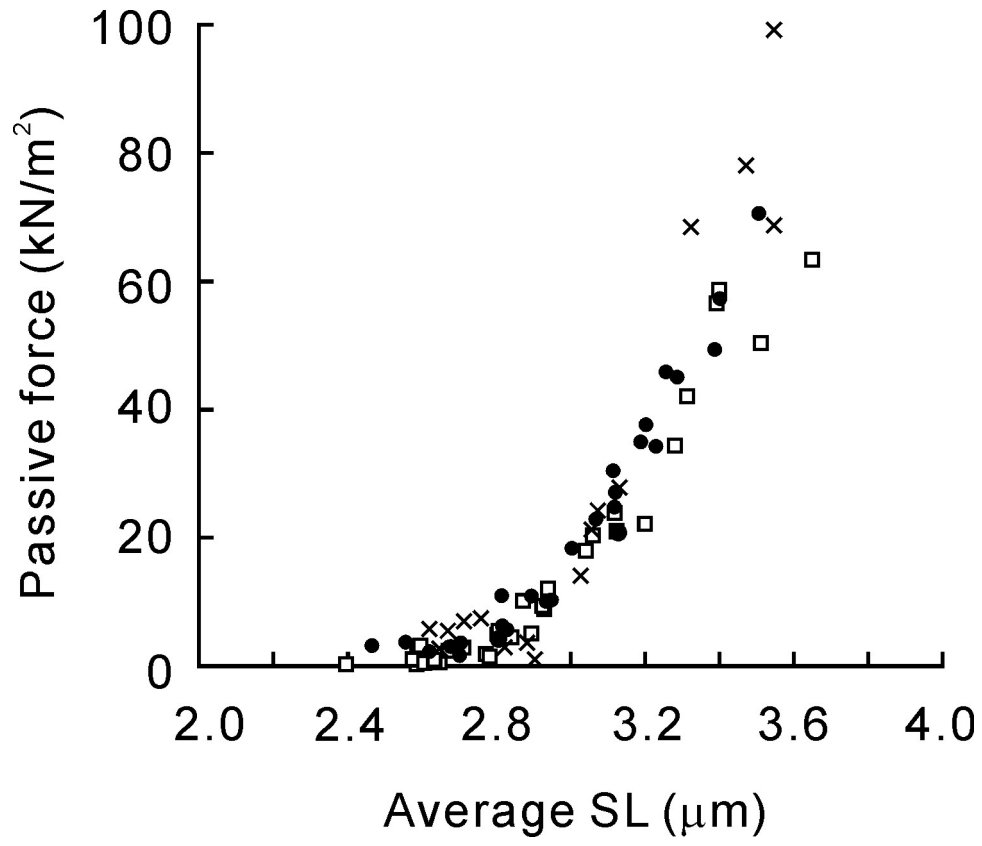
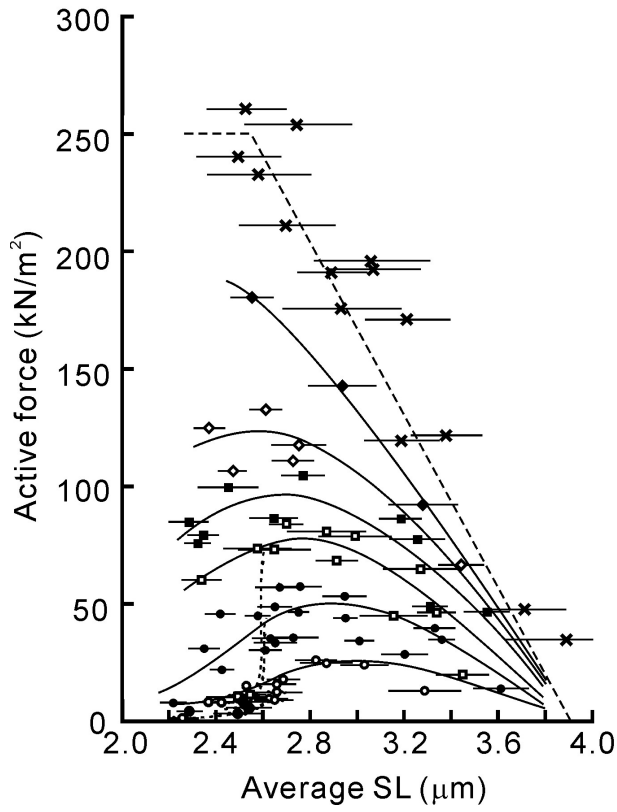


Figure S3

A



B

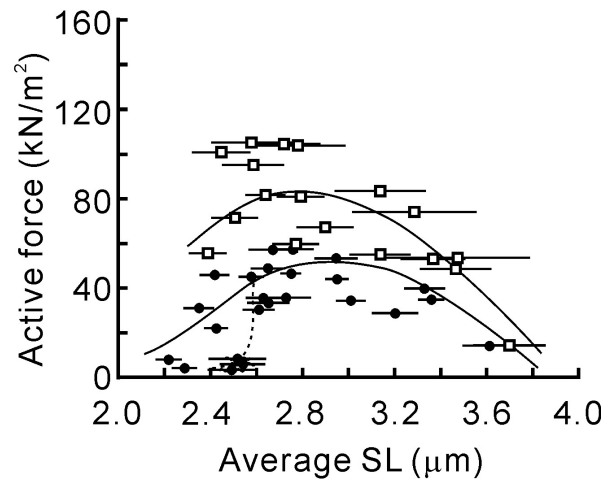


Figure S4

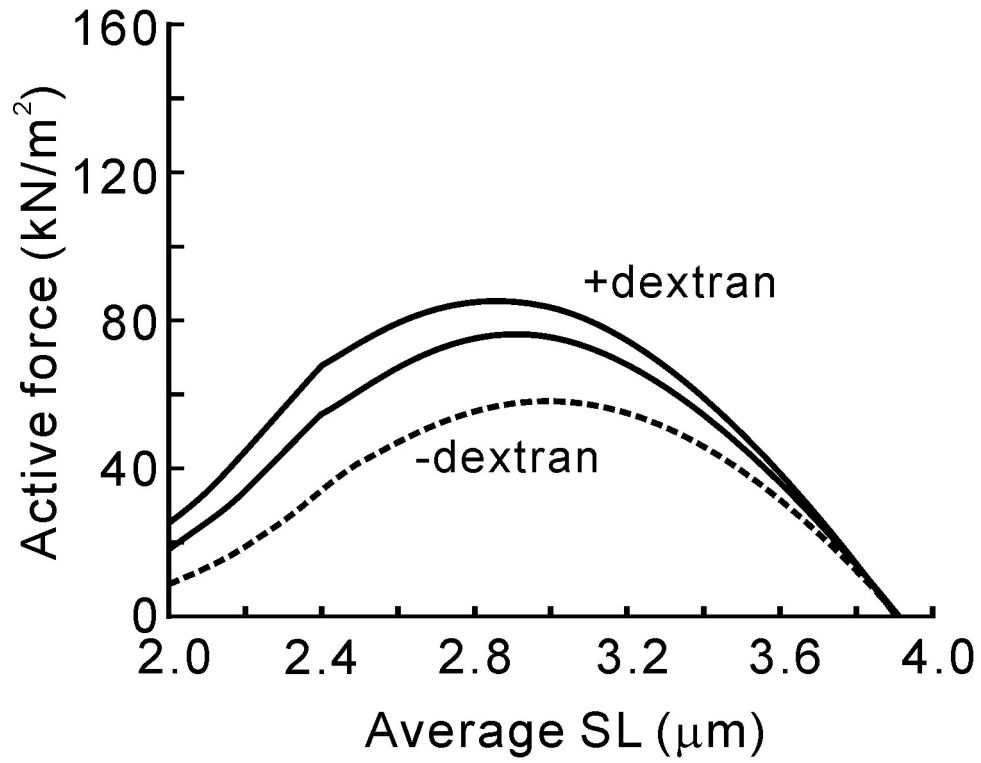


Figure S5

