Supporting Information

Ritter *et al.* 10.1073/pnas.0808414106

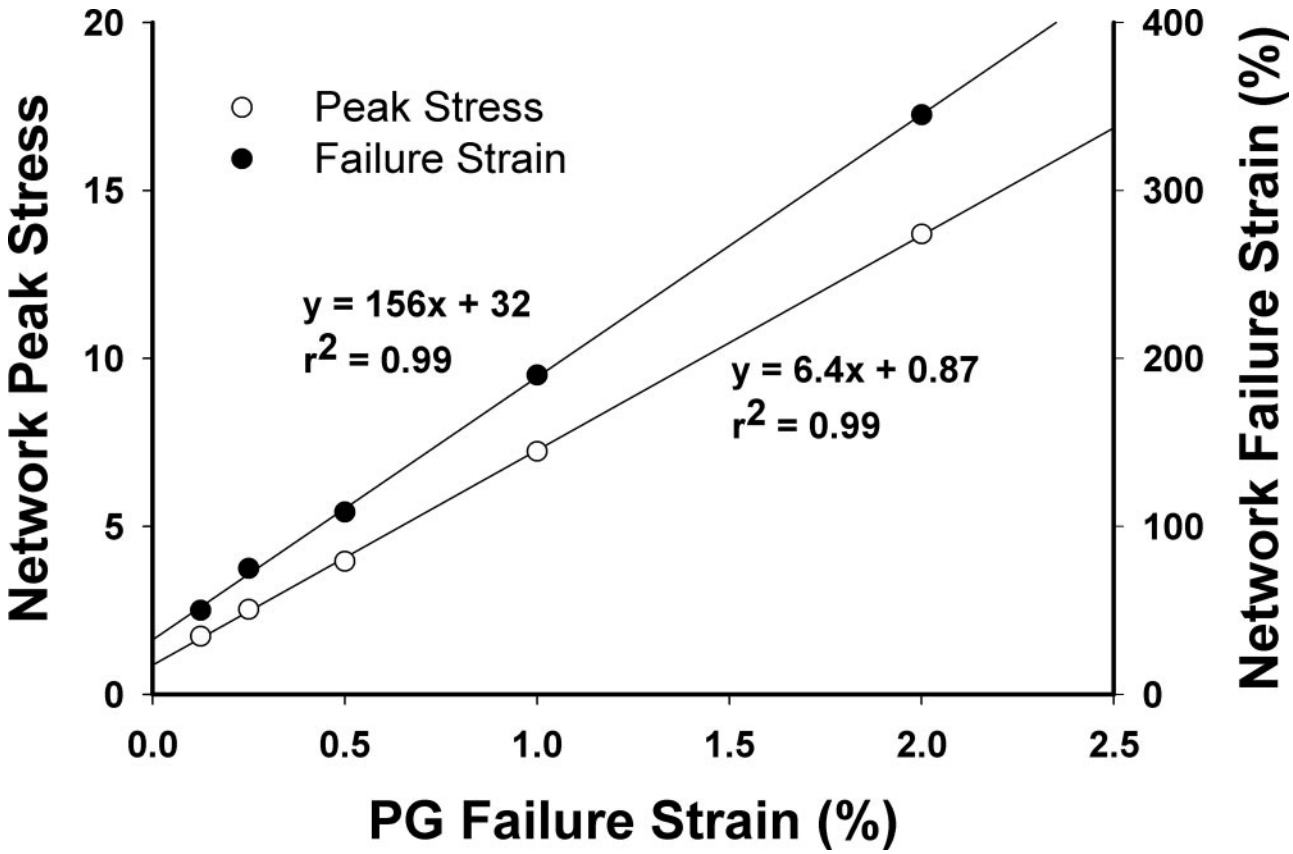


Fig. S1. Shown are the sensitivity of the peak stress and the failure strain of the whole zipper network model (ZNM) to the failure strain of the proteoglycans (PG). Both peak stress and failure strain linearly vary with the failure strain of the PGs.

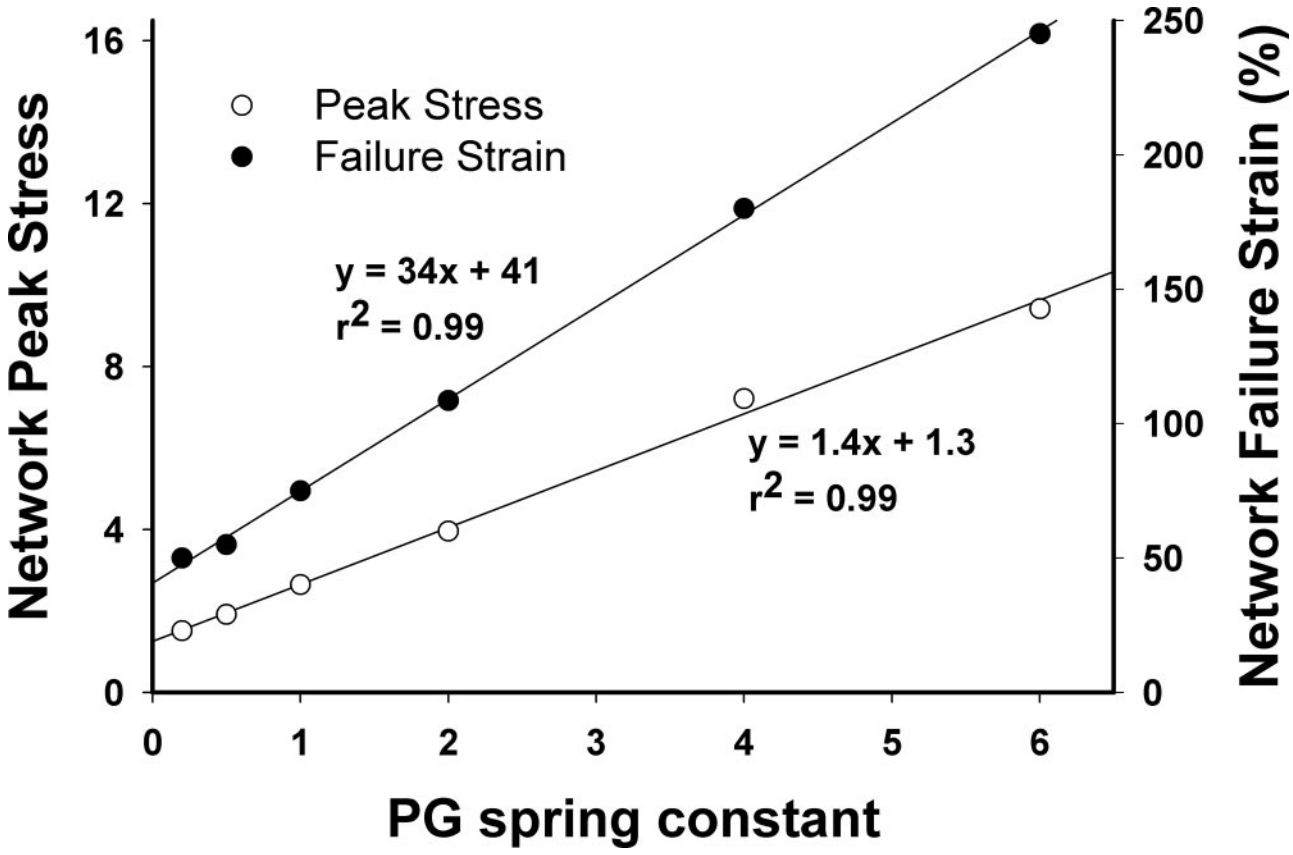
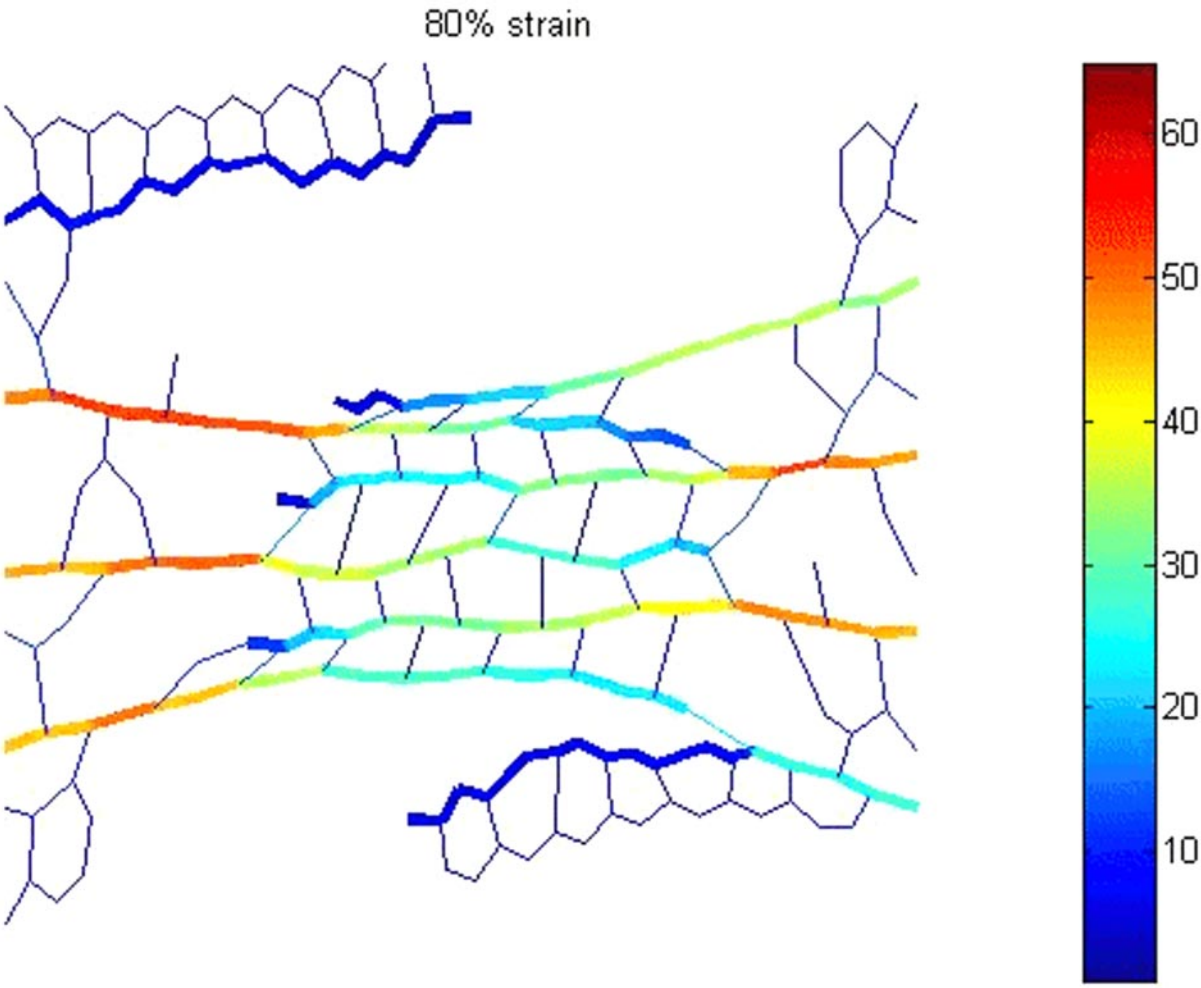
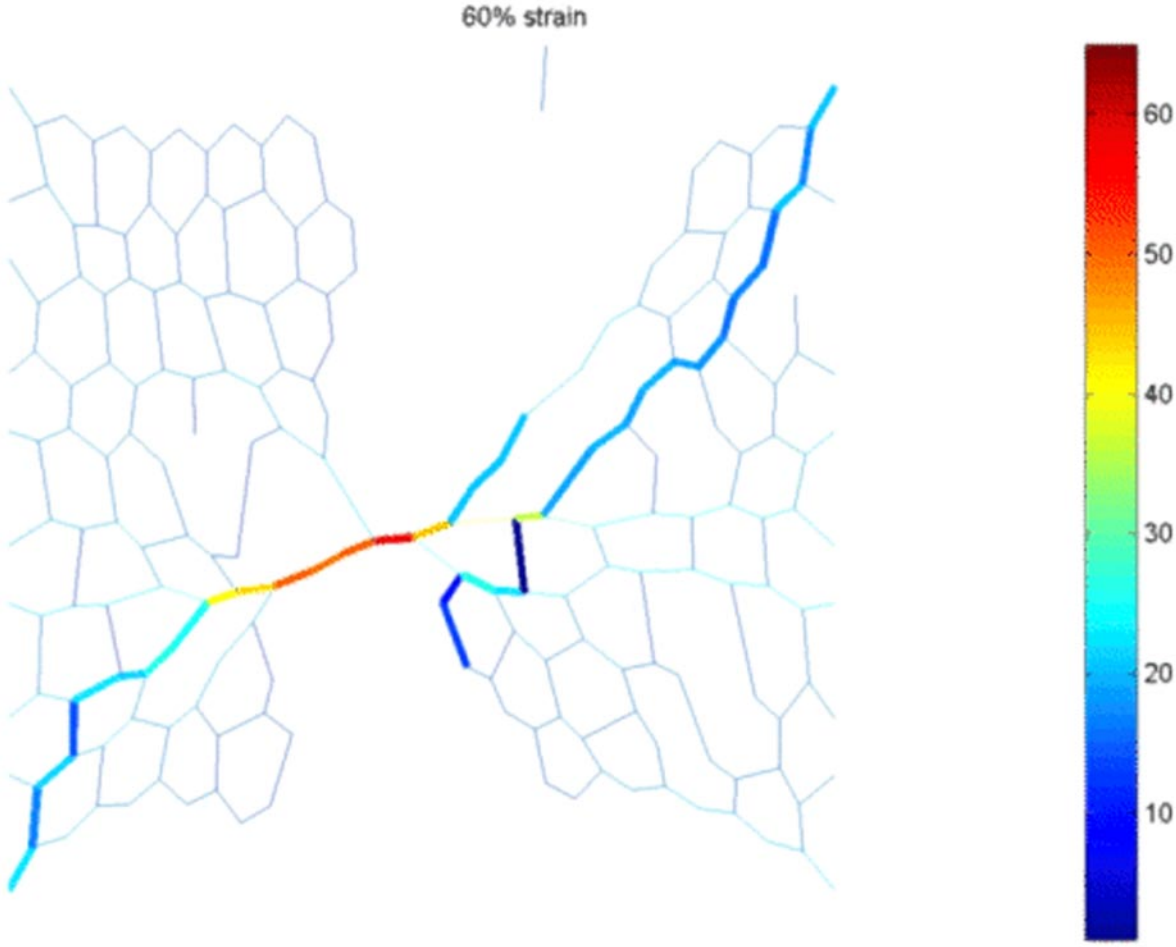


Fig. S2. Shown are the sensitivity of the peak stress and the failure strain of the whole ZNM to the spring constant of the PGs. Both peak stress and failure strain linearly vary with the spring constant of the PGs.



Movie S1. Full-network animation.

Movie S1 (GIF)



Movie S2. Two-fiber animation.

Movie S2 (GIF)

Table S1. Energy data

Simulation	Total energy	Elastin energy, % of total	Elastin energy in stretch, %	PG energy in stretch, %
Control	117.9	75.6	95.8	5.4
PGs removed, 30%	88.8	70.3	66.6	4.8
PGs removed, 60%	78.9	64.7	54.7	3.7
Elastin digestion	56.6	60.6	38.6	7.0

When bond bending is included, the percentage of energy on the elastin is lower (third column) compared with the percentage of energy of elastin in stretch (fourth column in the control case). However, bond bending can also represent the bending elasticity of the elastin and hence an unknown percentage of the bond-bending energy is also elastin related. Notice that with digestion percent the contribution of bond bending becomes more significant. The numbers correspond to the average of 7 simulations with random realizations of the network.