Direct Measurement of Intranuclear Strain Distributions and RNA Synthesis in Single Cells Embedded within Native Tissue

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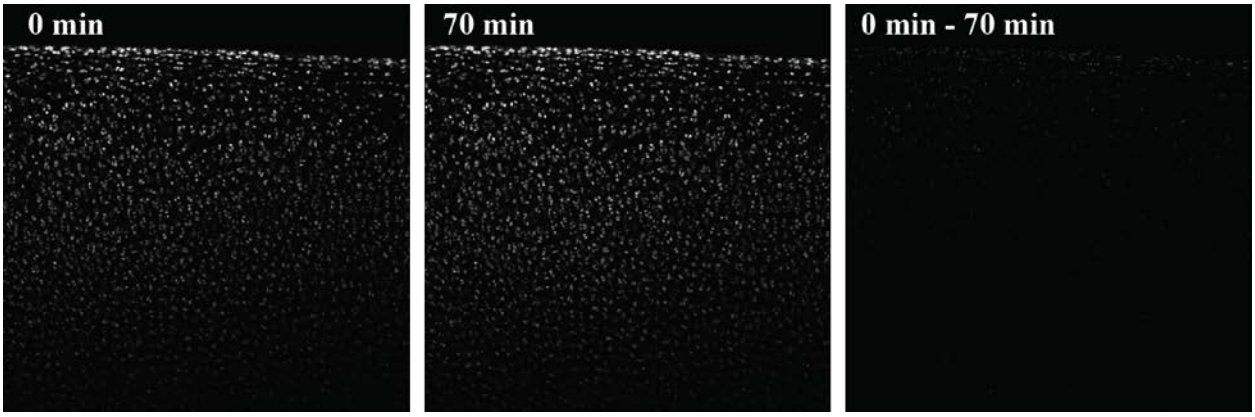
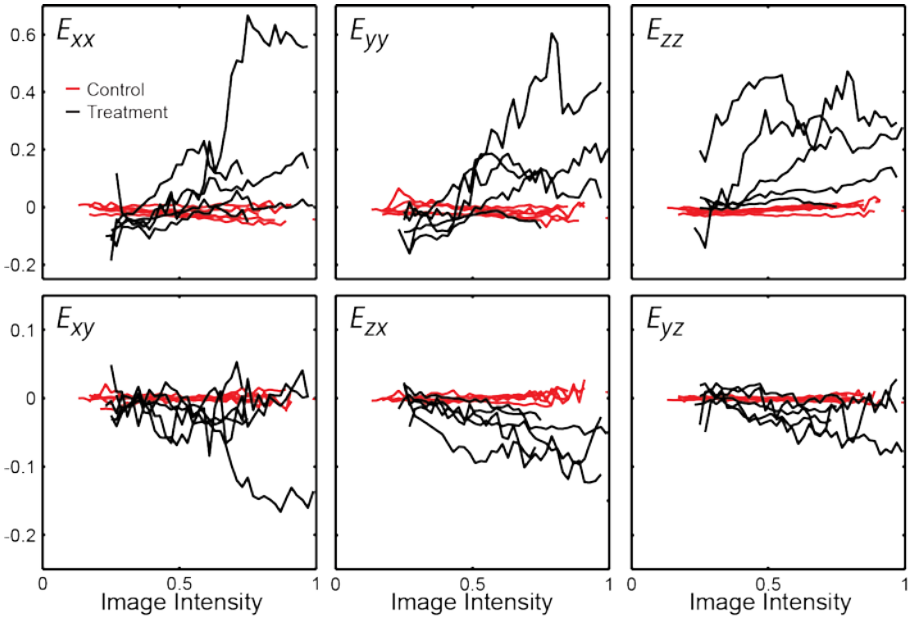
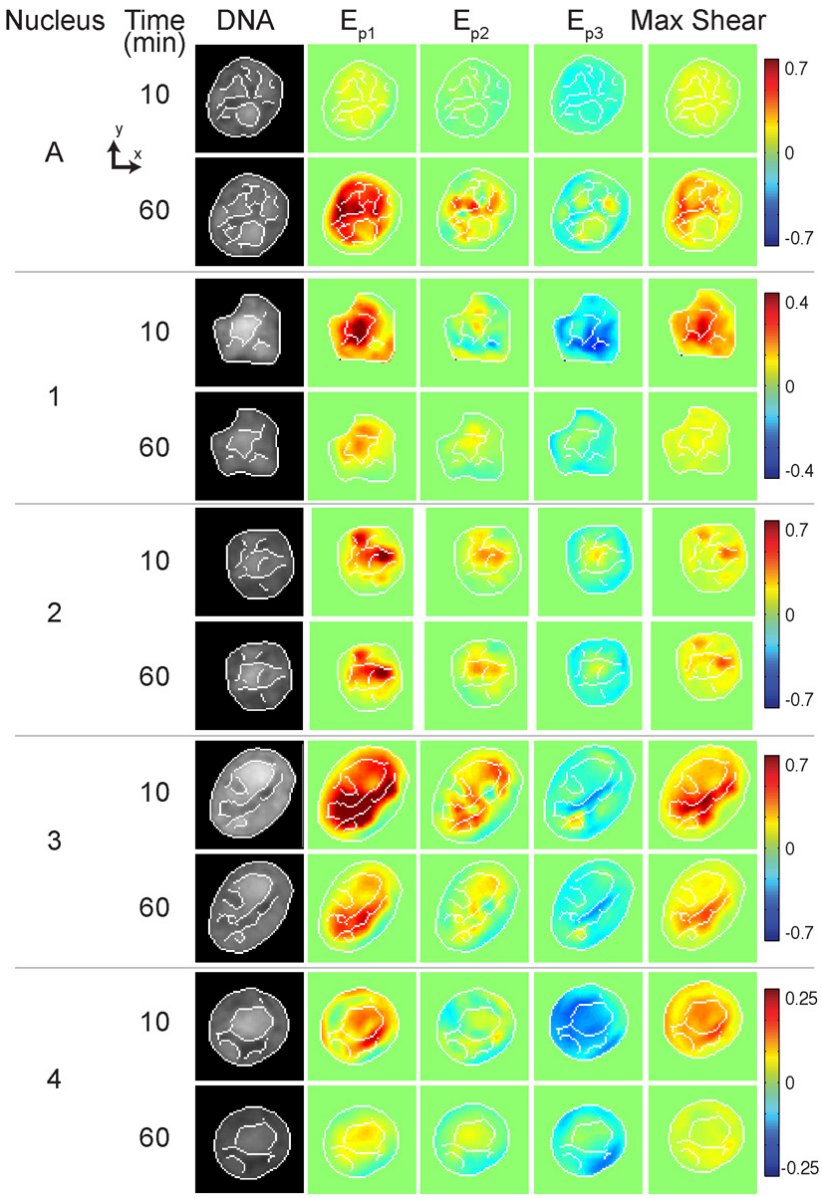
SUPPLEMENTAL FIGURES



Supplemental Figure 1. Cells remained viable during the time course of experiments. Cell viability was determined using a live/dead imaging kit (Invitrogen) at the beginning (0 min) of the incubation period, and at a later time that exceeded the studies described herein (70 min). A difference image (third panel) demonstrates no change in fluorescence signal in cells.



Supplemental Figure 2. Strain versus DNA image intensity plots for nuclei in tissues with (treatment) and without (control) a 15% applied tissue-scale strain. Nuclei (*n*=5) from strained tissues showed increased strains compared to control tissues, with horizontal control nuclei plots showing relatively small changes in strain levels with respect to DNA intensity. Applied tissue strain resulted in positive trends between strain and DNA, which varied among cells. Background strains were attributed to stochastic processes, biological remodeling, or imaging (e.g. partial volume) effects.



Supplemental Figure 3. The nuclear strain patterns for 10 and 60 minutes after the applied shear loading to the tissue surface varied among cells. Using hyperelastic warping, strain patterns were observed to increase (e.g. nucleus A), decrease (e.g. nucleus 1), or remain unchanged (e.g. nucleus 2) with time The hyperelastic warping analysis provides additional intranuclear spatial details that the small differences in aspect ratios between 10 and 60 min could not resolve. The small differences in the nuclear aspect ratios (nucleus A (-0.008), 1 (0.001), 2 (0.000), 3 (0.006), and 4 (0.064), above) indicates that the bulk deformation of the nucleus does not change over the experimental time period. Please note that nucleus A is also depicted in Figure 7, while nuclei 1-4 correspond to those shown in Figure 9. The white lines were overlaid on the DNA image and strain maps to aid in visualizing the chromatin and interchromatin regions.