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## Supplemental Information

# Ultrahigh-Resolution Optical Coherence Elastography Images Cellular-Scale Stiffness of Mouse Aorta

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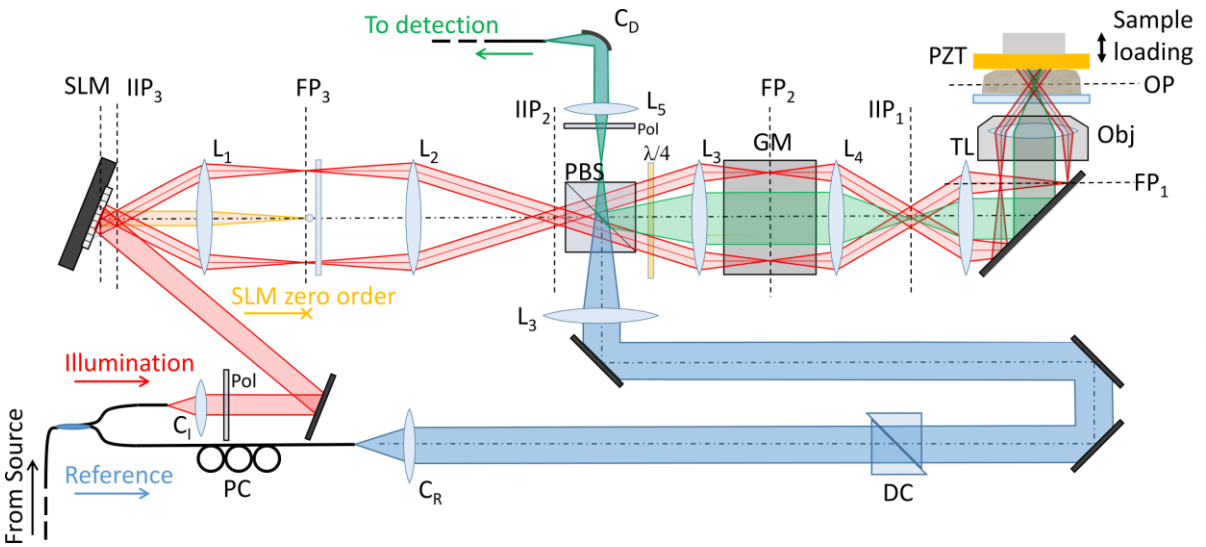


FIGURE S1 Optical setup of the ultrahigh-resolution optical coherence elastography system. Light from the supercontinuum source is split, in fiber, into free-space illumination and detection paths. Illumination light is shaped into a Bessel beam by a spatial light modulator (SLM). Galvanometer mirrors (GM) enable beam scanning across the sample. Back-scattered light from the sample is collected in the Gaussian mode, and interfered with the reference through a polarization beam splitter (PBS), with the polarization shift provided by a quarter-wave plate (λ/4). The interfered light is collected by a single-mode fiber, and relayed to a spectrometer. Sample loading is shown in Fig. 1. C: collimator; L: lens; TL: tube lens; PC: polarization controller; DC: dispersion compensation; Pol: polarizer; Obj: objective; PZT: piezoelectric actuator; OP: objective plane; IIP: intermediate image plane; FP: Fourier plane.

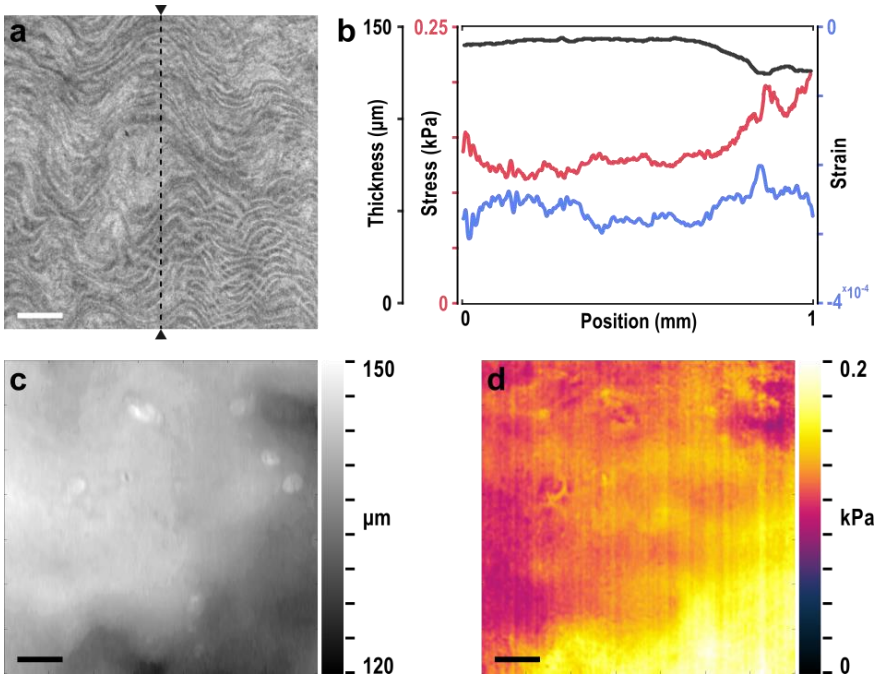


FIGURE S2 Intermediate outputs of ultrahigh-resolution optical coherence elastography. (*a*) En face (*x*,*y*) structural image of an aorta virtually sliced 20 μm past the adventitia, corresponding to Fig. 2 *a*. The dashed line indicates the location of the cross-section used to generate the plots in (*b*) of compliant layer (CL) thickness under bulk compression, and CL stress and sample strain from micro-scale actuation. Corresponding en face maps of total layer thickness (*c*) and stress from actuation (*d*). Scale bars are 100 μm.