SUPPLEMENT MATERIAL

TITLE: Mechanical assessment in atherosclerosis based on photoacoustic viscoelasticity imaging

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Supplemental Methods

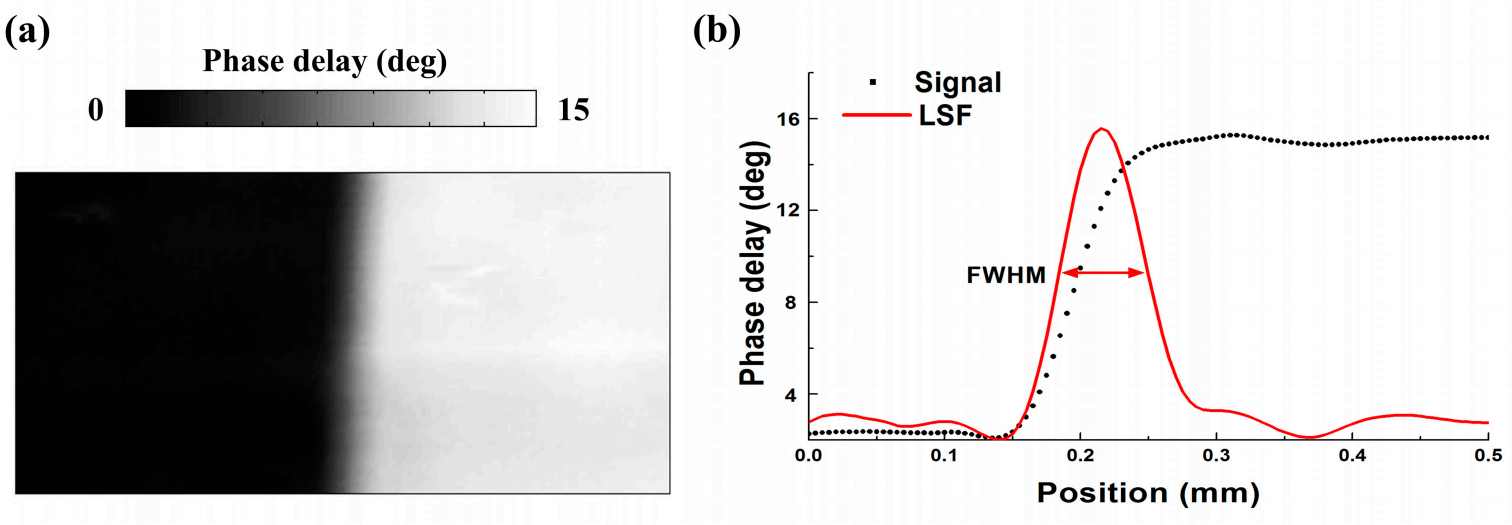
Phantom Experiments. The first phantom was utilized to assess the resolution of the system. A blade was embedded in a gelatin (48722; Sigma-Aldrich) phantom. The sample was imaged via PAVEI and the viscosity-elasticity ratio distribution on the edge was shown in Online Figure 1. The full-width-at-half-maximum (FWHM) of the signal line spread function (LSF) was calculated. The system had an approximate 65 μm transverse resolution.

Online Figure 2 shows the PA amplitude and phase delay of four samples marked with "a", "b", "c" and "d" contained gelatin with the concentration of 4%, 4%, 7%, 7% respectively. The samples "b" and "d" were interfused of ink with proportion of 4% and 8%, and their absorption coefficients are 1.15 cm^{-1} and 1.79 cm^{-1} respectively estimated by the UV-Vis spectrometer (Lamda 35, PE, USA).

2D PAVEI. Fifteen Apolipoprotein E-knockout mice (C57BL/6 background; Guangdong Province Medicine Laboratory Animal Center, China) were euthanized with an overdose of pentobarbital (3%, 120 mg/kg). The thoracic aortas were harvested and further examined with PAVEI. Saline was inserted into the aortic lumen for ultrasonic signal coupling during data acquisition.

Online Figure

Online Figure S1. Resolution of the PAVEI system. (A) PAVEI of the blade-edge. (B) The viscosity-elasticity ratio distribution on the edge and the line spread function (LSF). The full-width-half-maximum (FWHM) is about 65 μm.



Online Figure S2. Amplitude and phase delay of PA signals and noise. (A) Amplitude of PA signal from sample "a", "b", "c" and "d" in a 3 s time window. (B) Amplitude of noise in a 3 s time window. (C) Phase delay of PA signal from sample "a", "b", "c" and "d" in a 3 s time window. (D) Phase delay of noise in a 3 s time window.