

**Supplement to “Fluctuating and sensory-induced vasodynamics in rodent cortex predominantly extends arteriole rather than venous capacity” by Patrick J. Drew , Andy Y. Shih and David Kleinfeld.**

**Supplementary Figure Legends**

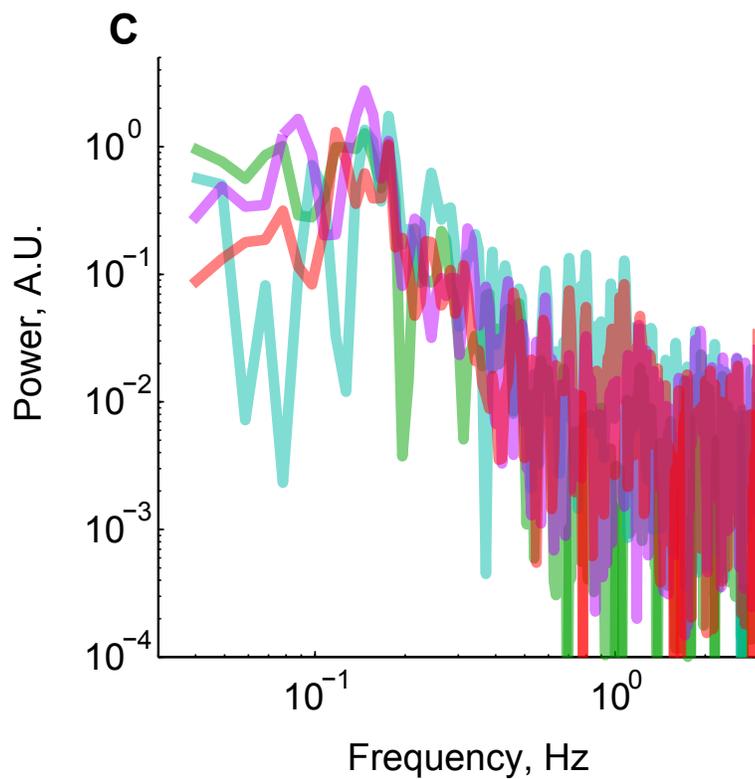
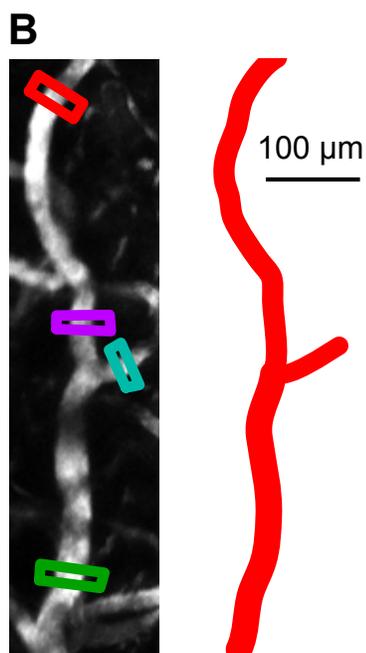
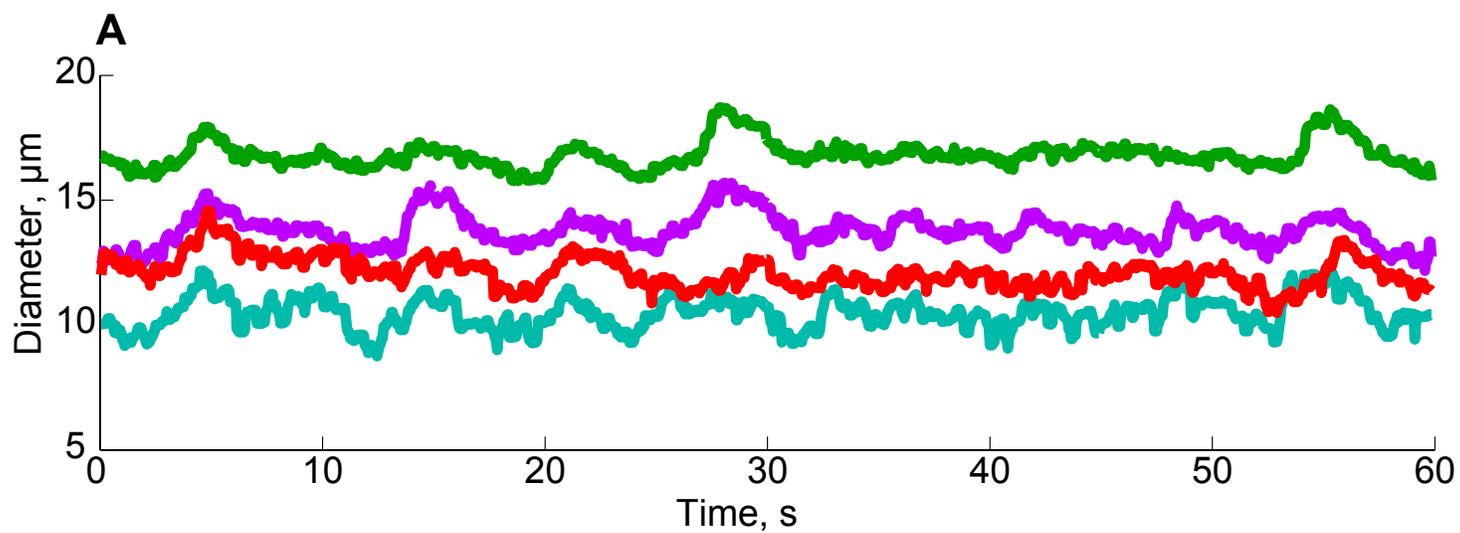
**Supplementary Figure 1. Example of spontaneous oscillations in arterial diameter in awake animals.** (A) Plot of vessel diameters of a quietly resting mouse from a representative 1 minute span. (B) Left, image of surface vasculature taken where diameter measurements in panel A were taken. Right, schematic showing position of artery in the image. (C) Power spectrum of the fluctuations in diameter of the same vessels.

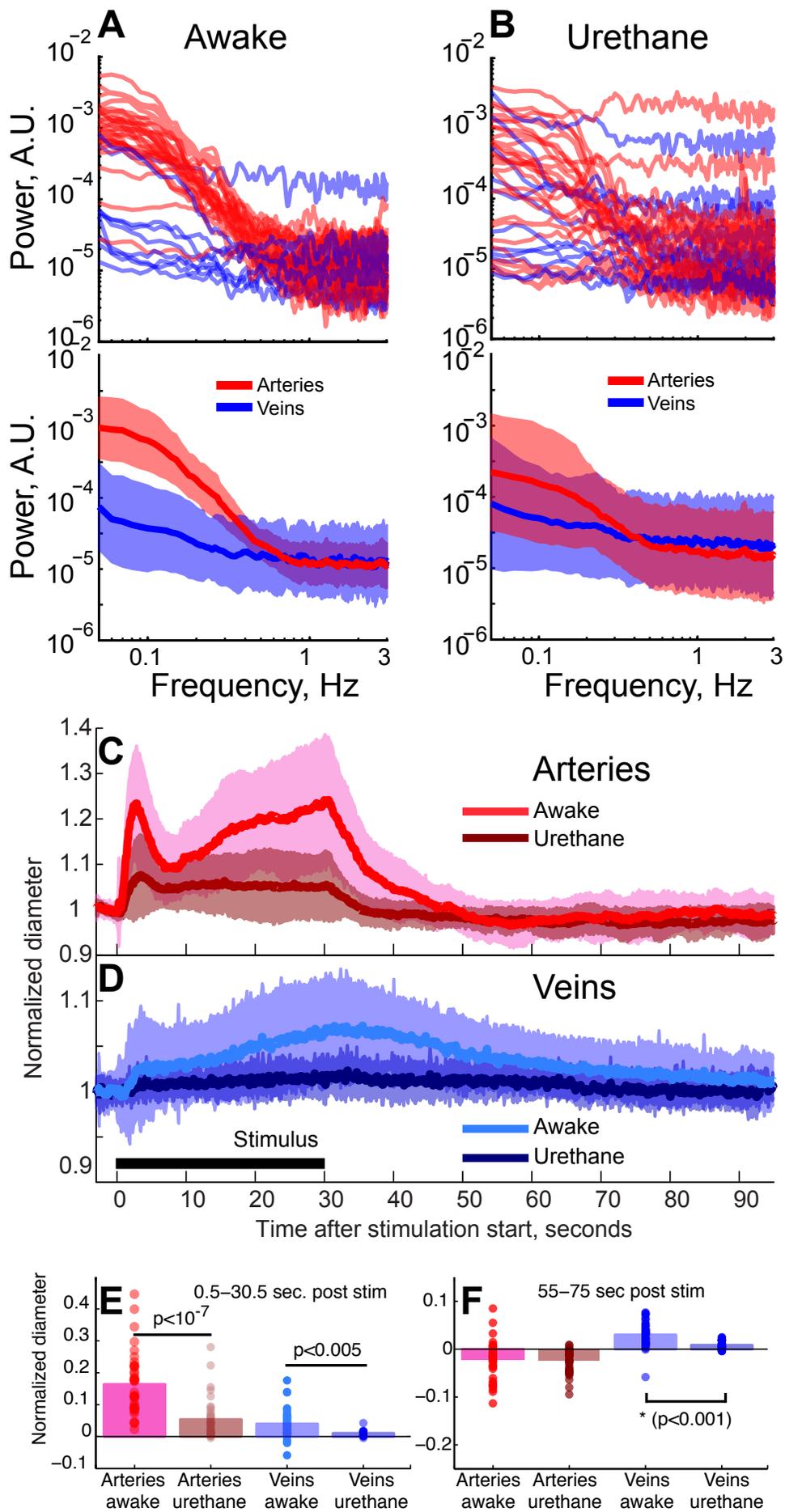
**Supplementary Figure 2. Comparison of anesthetized and awake dynamics.** (A) Comparison of spontaneous vessel dynamics in awake and anesthetized mice. Top, power spectra for greater than 500 s long traces of arterial (red, n = 34 vessels) and venous (blue, n = 7 vessels) diameters from awake mice. Bottom shows mean  $\pm$  SD. (B) Power spectra for greater than 500 s long traces of arterial (red, n = 30 vessels) and venous (blue, n = 11 vessels) diameters from urethane anesthetized mice. There is a significant reduction in spectral power for arterioles in the 0.1 to 1 Hz range between the awake and anesthetized animals (K-S test done on log transformed data,  $p < 0.001$ ) (C) Averaged relative response of arteries to vibrissa stimuli in the awake (n = 39 vessels) and urethane anesthetized (n = 39 vessels) stimulus conditions. (D) Averaged normalized responses of veins in awake (n = 45) and urethane anesthetized animals (n = 18 vessels). (E) Responses of arteries and veins averaged over stimuli for the period 0.5 to 30.5 s after stimulus onset. (F) Post- stimulus responses of arteries and veins after a 30 s duration stimulus. Data obtained over the period 55 to 75 s after stimulus onset.

**Supplementary Figure 3. Examples of evoked diameter changes for a 30 s stimulus.** (A) Image of vessels averaged over 2 s of baseline, before stimulus presentation. (B) Image of vessels averaged 3 to 5 s after stimulus onset. (C) Schematic showing artery, red, and veins, in blue. (D) Plots of raw evoked diameter changes in response to stimulation. Vessel location is coded by color. Colored lines are responses to vibrissa stimulation, black lines are responses to the control stimulus. Time points from frames with  $> 4 \mu\text{m}$  of motion are omitted.

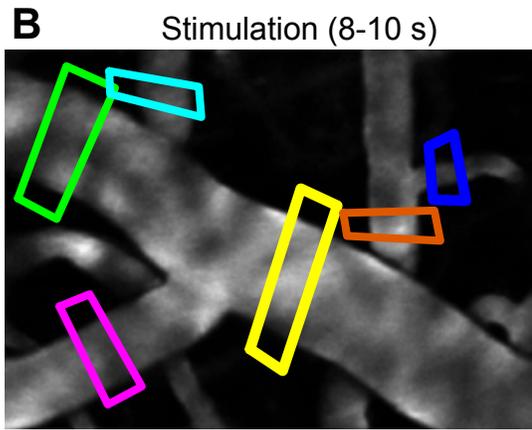
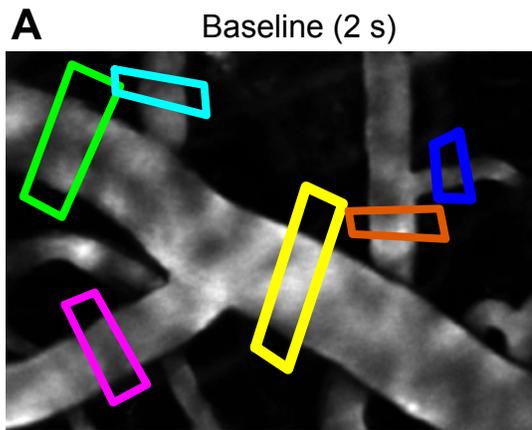
**Supplementary Figure 4. Evoked diameter changes as a function of stimulus duration.** (A) Averaged population responses of arteries (top, n = 28) veins (middle, n = 7) and capillaries (bottom, n = 13) to a single air puff aimed at vibrissa (purple) or control (black). (B) Average population response of arteries (top, n = 17) and veins (bottom, n = 8) to 10 s of 8 Hz vibrissa or control stimuli. (C) Average population response of arteries (top, n = 39), veins (middle, n = 45) or capillaries (bottom, n = 19) to 30 s of stimulation.

**Supplementary Figure 5. Changes in heart rate do not explain differences between control and stimulus evoked changes.** Top, plot of ratio of vibrissa evoked speedup/control evoked speedup to vibrissa/control heart rate for single air puff stimuli.  $r^2 = 0.04$  and slope 0.12. Bottom, plot of ratio of vibrissa evoked speedup/control evoked speedup to vibrissa/control heart rate during 30 s stimulation. Heart rate is determined from the peak in the power spectrum of the velocity.





Supplementary Figure 2, Drew, Shih and Kleinfeld, 2011



50  $\mu\text{m}$

