Supplementary data for:

*In Vivo* Penetration Mechanics and Mechanical Properties of Mouse Brain Tissue at Micrometer Scales

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Supplement to Figure 2:

Load-displacement response for insertion and removal of the 200 μm diameter flat punch probe with an insertion rate of 822 μm/s. (A) Duplicate load-displacement curves for insertion into the olfactory bulb. (B) A general schematic of the load-displacement curve for the insertion and removal of a flat punch probe. $K_1$ is the slope of the linear portion of the Stage I response. $K_2$ is the slope of the linear portion of the response during probe removal. $E$ is the modulus of the tissue, $d$ is the diameter of the probe, $\mu$ is the coefficient of friction between the probe and the surrounding tissue, and $F_{crit}$ is the force at which the flat punch probe penetrates the tissue.
Supplement to Figure 3(a):

The effect of rate on the load-displacement response for insertion and removal of the 200 μm diameter flat punch probe in the cortex. Duplicate load-displacement curves for insertion at rates of (A) 104 μm/s and (B) 11 μm/s.
Supplement to Figure 3(a):

The effect of rate on the load-displacement response for insertion and removal of the 200 μm diameter flat punch probe in the olfactory bulb. Duplicate load-displacement curves for insertion at rates of (C) 104 μm/s and (D) 11 μm/s.
Supplement to Figure 3(b):

The effect of probe size on the load-displacement response for the insertion and removal of the flat punch probe. Duplicate load-displacement curves for the 100 μm diameter probe inserted into the cortex at insertion rates of (A) 822 μm/s, (B) 104 μm/s and (C) 11 μm/s.
Supplement to Figure 3(c):

Load-displacement response for insertion and removal of the sharpened 200 μm diameter probe with an insertion rate of 822 μm/s. Duplicate load-displacement curves for insertion into the (A) cortex and (B) olfactory bulb. (C) A general schematic of the load-displacement curve for the insertion and removal of a sharpened probe. \( K_3 \) is the slope of the force-displacement response during probe insertion. \( K_2 \) is the slope of the linear portion of the response during probe removal. \( E \) is the modulus of the tissue, \( d \) is the diameter of the probe, \( \mu \) is the coefficient of friction between the probe and the surrounding tissue, and \( F_{cut} \) is the cutting force of the tissue.
Supplement for Figure 3(c):

Load-displacement response for insertion and removal of the sharpened 200 μm diameter probe with an insertion rate of 11 μm/s. Duplicate load-displacement curves for insertion into the (D) cortex and (E) olfactory bulb.