

Title: Imaging the activity patterns of identified single neurons

Nearby neurons, sharing the same locations within the mouse whisker map, can have dramatically distinct response properties. To understand the significance of this diversity, we studied the relationship between the responses of individual neurons and their projection targets. Neurons projecting to primary motor cortex (MI) or secondary somatosensory area (SII) were labeled with red fluorescent protein (RFP) using retrograde viral infection. We used in vivo two-photon Ca²⁺ imaging to study the responses of RFP-positive and neighboring L2/3 neurons to whisker deflections. Neurons projecting to MI displayed larger receptive fields compared to other neurons, including those projecting to SII. Our findings support the view that intermingled neurons in primary sensory areas send specific stimulus features to different parts of the brain.