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A common mechanism, but disparate roles for divisive inhibition in the dendrites of visual cortical neurons

A key challenge in reverse engineering the visual cortex is to understand how the dendrites of pyramidal neurons integrate their excitatory and inhibitory inputs over space and time. Recent experimental and modeling studies will be reviewed that bear on the arithmetic of excitatory-inhibitory integration in pyramidal neurons, leading to the suggestion that inhibitory inputs to the thin basal and apical oblique dendrites act divisively on neuronal firing rates. Based on this biophysical mechanism, it will be shown how a simple feedforward circuit template involving a single inhibitory interneuron could contribute to two apparently disparate visual processing functions: (1) optimal cue combination, and (2) focal visual attention.