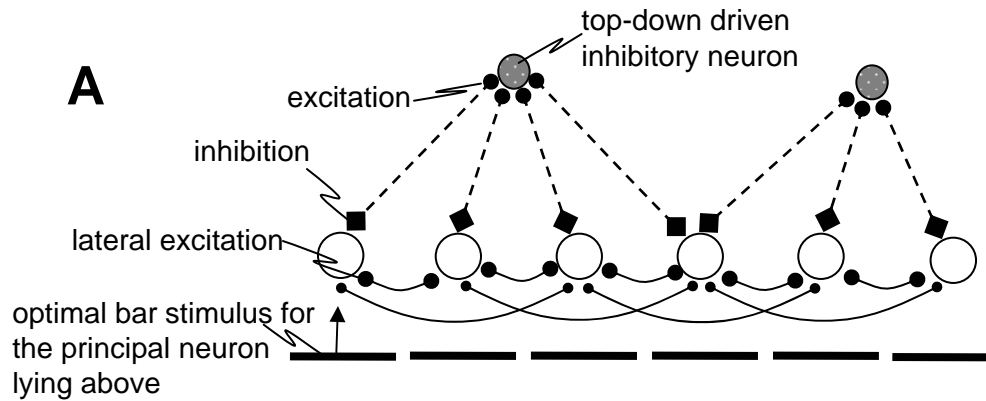
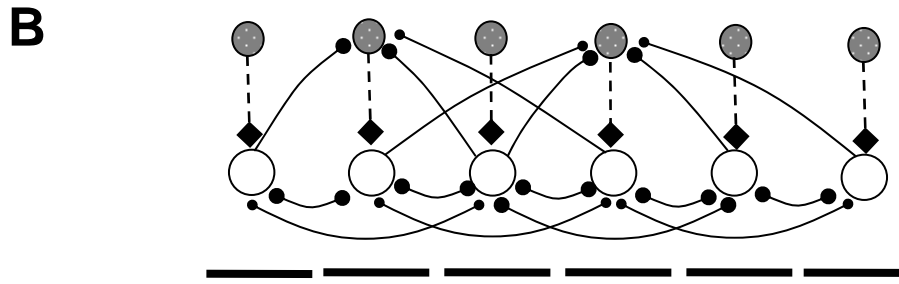


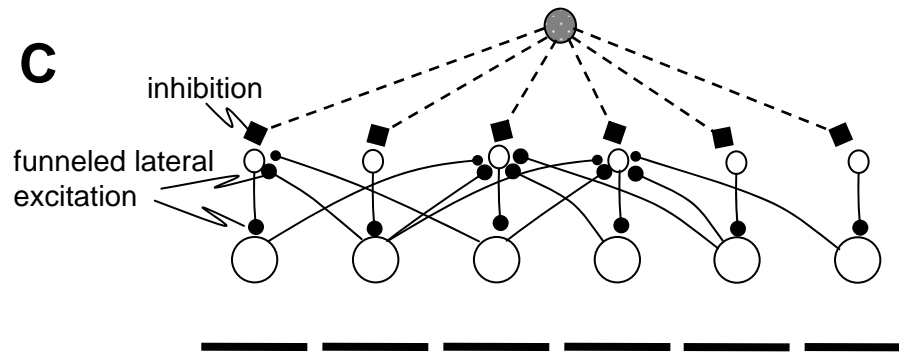
Supplementary material: Different wirings for suppressing lateral excitation



A) Recurrent inhibition (version investigated in the paper). A few inhibitory neurons (filled circles) which are recurrently connected to a population of excitatory principal neurons (open circles) with receptive fields aligned in a row (black dots represent excitatory synapses, diamonds inhibitory synapses). The principal neurons which laterally excite each other will also inhibit each other through the corresponding inhibitory neuron, provided that top-down input (not shown) drives this inhibitory neuron towards threshold.



B) Unidirectional inhibition (alternative 1). Each principal neuron may have its own inhibitory neuron which is driven by the surrounded principal neurons. Lateral excitation is cancelled by properly tuning the inhibitory loop running in parallel to the lateral excitation. As in (A), the strengths of the inhibitory loop and the top-down input have to be fine tuned.



C) Funneled lateral excitation (alternative 2). If lateral excitation would drive the principal neurons through individual bottleneck-neurons (small open circles), it would be easy to be suppressed by inhibiting these bottlenecks. Although no fine tuning is required in this solution, a fairly specific connectivity pattern among the excitatory neurons is assumed.