## Text S6. Canonical hippocampal-cortical network (Model 2).

**Neuron model of the canonical network:** Neurons were implemented as one-compartment leaky integrate and fire units. Instantaneous membrane potential, , of neuron $i$ was related to the feedforward current evoked by the EPSP, , the global feedback current evoked by the IPSP, , and an after hyperpolarization current, 

  (1)

Where RN = 100 MΩ is the membrane resistance and τN = 20 ms the membrane time constant. Whenever the membrane potential reached a threshold level, VTH= -50 mV, the neuron emitted an action potential, , and the membrane potential was reset to a rest potential, VREST= -60 mV:

  (2)

 $S\_{N}^{i}\left[t\right]=\left\{\begin{matrix}V\_{N}^{i}\left[t\right]>V\_{TH},&1\\else,&0\end{matrix}\right.$ (3)

An after hyper-polarization current ( ) was released following a spike of neuron $i$ with amplitude of AAHP = -2 nA and time constant of τAHP = 1.7 ms in an exponential decay.

The feed-forward excitatory current, , was computed by the difference between the excitatory potential, VFF=0 mV and the membrane potential modulated by the sum of influence of single input events weighted by the specific input-neuron synapse conductance, Wij[t]. Single events evoked EPSP was subject to an exponential decay with time constant of τFF = 5 ms:

  (4)

The feedback inhibitory current, IFB[t], was obtained as a delayed (dFB= 3.3 ms) exponential decay function of amplitude AFB = -20 nA and decay of τFB = 3 ms and was triggered by the first spike in the network after a period of 10 ms after previous IPSP release, tlast[t]:

  (5)

  (6)