

Burst and Tonic Firing, Summary UCL

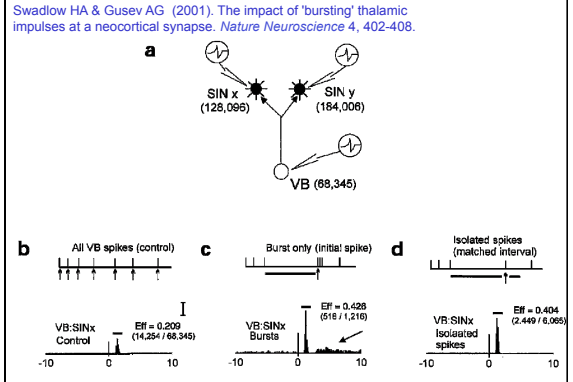
- Thalamic Relay Cells can have two distinct modes of firing: Tonic and Burst.
- The firing mode is dependent upon membrane potential, and burst firing depends critically upon I_T .
- The membrane potential can be affected by various modulators (e.g. Ach).
- This affects ongoing activity (EEG) and responses to driver inputs.

A wake up call UCL

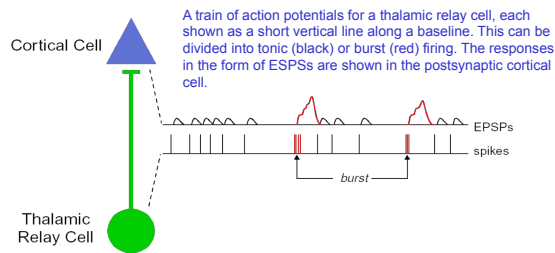
The role of thalamic burst firing in normal behaviour has been controversial. However, new evidence suggests that bursting may serve as a wake-up call to the cortex.

Swadlow HA & Gusev AG (2001). The impact of 'bursting' thalamic impulses at a neocortical synapse. *Nature Neuroscience* 4, 402-408.
 Sherman, S.M. 2001. A Wake-up Call From the Thalamus. *Nature Neuroscience* 4, 344- 346.

Swadlow HA & Gusev AG (2001). The impact of 'bursting' thalamic impulses at a neocortical synapse. UCL

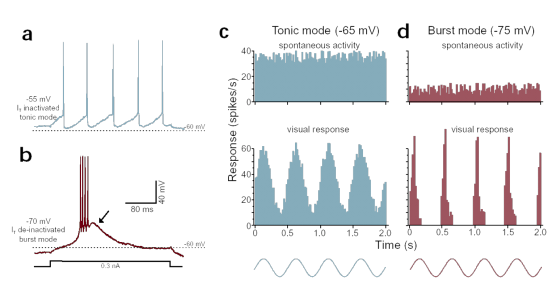


Schematic interpretation of results of Swadlow & Gusev UCL

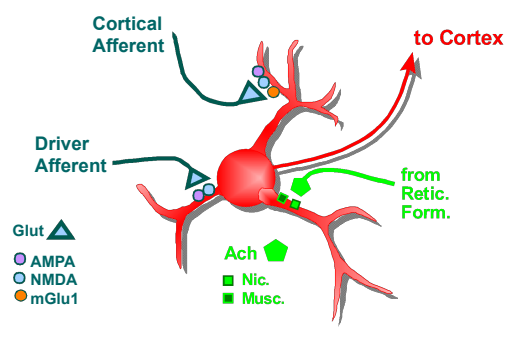


- Note that the responses to bursts (red EPSPs) are larger than those to tonic firing (black EPSPs).
- The increased amplitude of the burst-evoked EPSPs are due to both a larger initial EPSP and temporal summation.

Burst and Tonic Firing and Visual Responses UCL

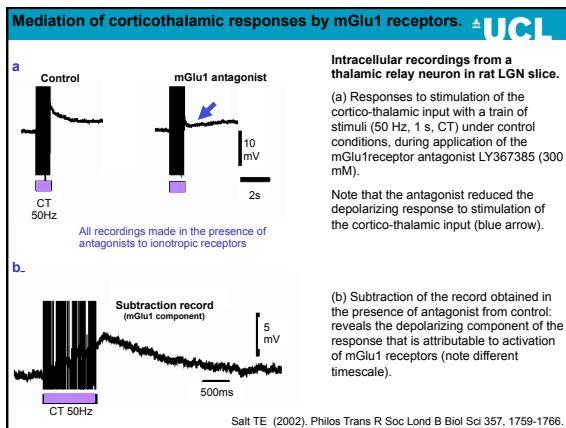
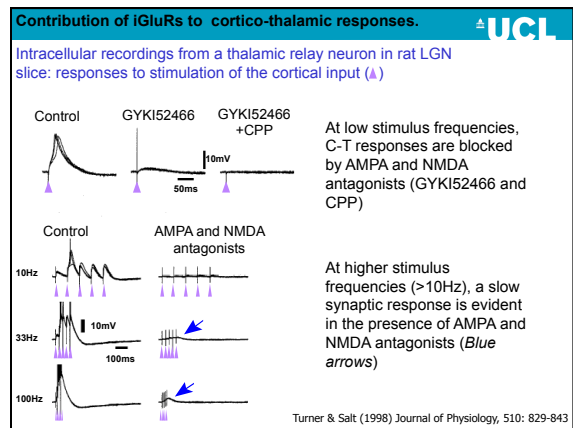
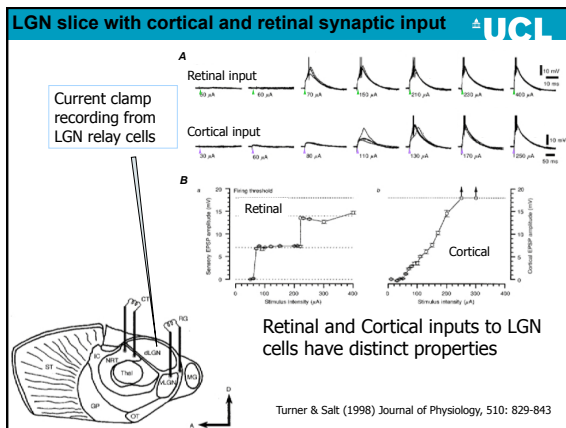
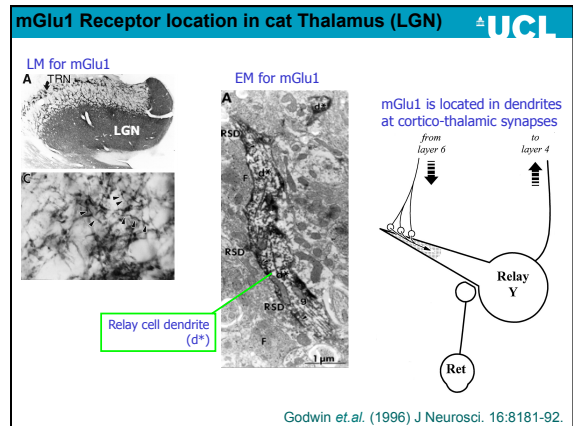
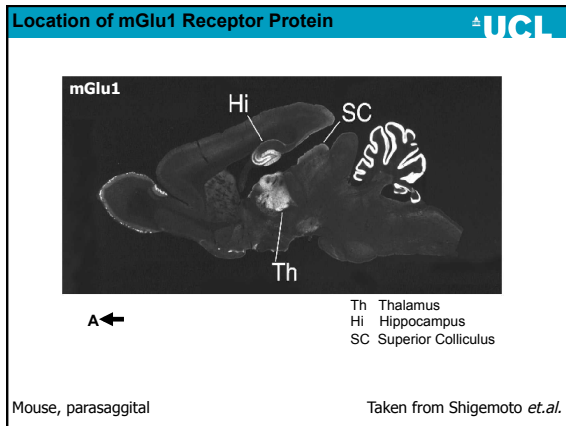


Synaptic Inputs to Thalamic Relay Cell UCL



Functions of the cortico-thalamic system? UCL

- Remember*
- Corticothalamic inputs outweigh sensory inputs
 - In relay nuclei (e.g. LGN), Cortical Layer 6 provides the major corticofugal input
 - Corticofugal input is glutamatergic (excitatory).



Are mGlu1 Receptors in the LGN activated under physiological conditions?

