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## POSTER PRESENTATION

# Astrocytic theory of working memory

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*From* The Twenty Third Annual Computational Neuroscience Meeting: CNS\*2014 Québec City, Canada. 26-31 July 2014

Working memory (WM) is the ability to transiently hold and manipulate goal-related information to forthcoming actions. In primates performing delayed-response tasks, the neural correlate of WM is the emergence of selective persistent activity in the prefrontal cortex (PFC), during the delay period – i.e., the increase of neuronal firing rates compared to baseline in response of specific stimulatory cues. Neuronal firing during such persistent activity can be highly irregular, with a coefficient of variation (CV) of the interspike interval distribution larger



**Figure 1** Astrocyte-based mechanism of working memory (WM). **A** Simulated firing activity of a cortical neuron before, during and after the presentation of a stimulatory cue (*purple bar*). **B** The same cue induces persistent firing activity in presence of astrocyte-mediated synaptic facilitation for more than 10 seconds (*red shade*). **C** Astrocyte-mediated facilitation results in bistability of synaptic release. **D** Synaptic release enhanced by the astrocyte may outlast the stimulatory cue as long as the astrocyte is kept active by the very synaptic stimuli impinging on the astrocyte. **E** The resulting neuronal firing statistics is more irregular in presence of the astrocyte, as marked by (**F**) a coefficient of variation (CV) larger than 1 after presentation of the cue (*purple shade*).

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Published: 21 July 2014

doi:10.1186/1471-2202-15-S1-P206 Cite this article as: De Pittà *et al*: Astrocytic theory of working memory. *BMC Neuroscience* 2014 15(Suppl 1):P206.

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