

ORAL PRESENTATION

Open Access

The modular cross-synaptic nature of LTP/LTD following on-going neural activity

Alex Loebel^{1*†}, Jean-Vincent Le Bé^{2†}, Magnus JE Richardson³, Andreas Herz¹, Henry Markram²

From Twentieth Annual Computational Neuroscience Meeting: CNS*2011
Stockholm, Sweden. 23-28 July 2011

While synaptic efficacies are modified continuously by on-going spiking activity, it is yet unclear whether the underlying pre- and post-synaptic processes occur independently, or in accordance. To elucidate the effects of sustained spiking communication on synaptic properties, we patch-clamped paired pyramidal neurons in-vitro at both ends of 12h intervals of spontaneous or glutamate-induced spiking activity. We found that the synaptic efficacies either increased, or decreased, with the ratio between the second and first measurement ranging between 0.08-14. Using quantal and failure analyses we show that this slow form of long-term potentiation and depression is explained by changes in the estimated number of release sites, alongside overall post-synaptic changes that maintain the quantal size per release site. Our findings suggest that sustained neural activity results in matched pre- and post-synaptic modifications, in which elementary modules that span the synaptic cleft are added or subtracted as a function of experience.

Author details

¹Department Biologie II, LMU, and Bernstein Center Munich, Germany. ²Brain Mind Institute, Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland. ³Warwick Systems Biology Centre, University of Warwick, Coventry, UK.

Published: 18 July 2011

doi:10.1186/1471-2202-12-S1-O1

Cite this article as: Loebel et al.: The modular cross-synaptic nature of LTP/LTD following on-going neural activity. *BMC Neuroscience* 2011 **12** (Suppl 1):O1.

* Correspondence: alex.loebel@gmail.com

† Contributed equally

¹Department Biologie II, LMU, and Bernstein Center Munich, Germany
Full list of author information is available at the end of the article

Submit your next manuscript to BioMed Central
and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

